MHI

TECHNICAL MANUAL

Manual No.'10•SR-T-091

INVERTER RESIDENTIAL AIR CONDITIONERS
(Split system, air to air heat pump type)

Wall mounted type
SRK20ZJ-S
25ZJ-S
35ZJ-S
50ZJ-S

SRK20ZJX-S
25ZJX-S
35ZJX-S
50ZJX-S
60ZJX-S

Floor standing type
SRF25ZJX-S
35ZJX-S
50ZJX-S

Ceiling concealed type
SRR25ZJ-S
35ZJ-S

Ceiling cassette-4way compact type
FDTC25VD
35VD

MITSUBISHI HEAVY INDUSTRIES, LTD.

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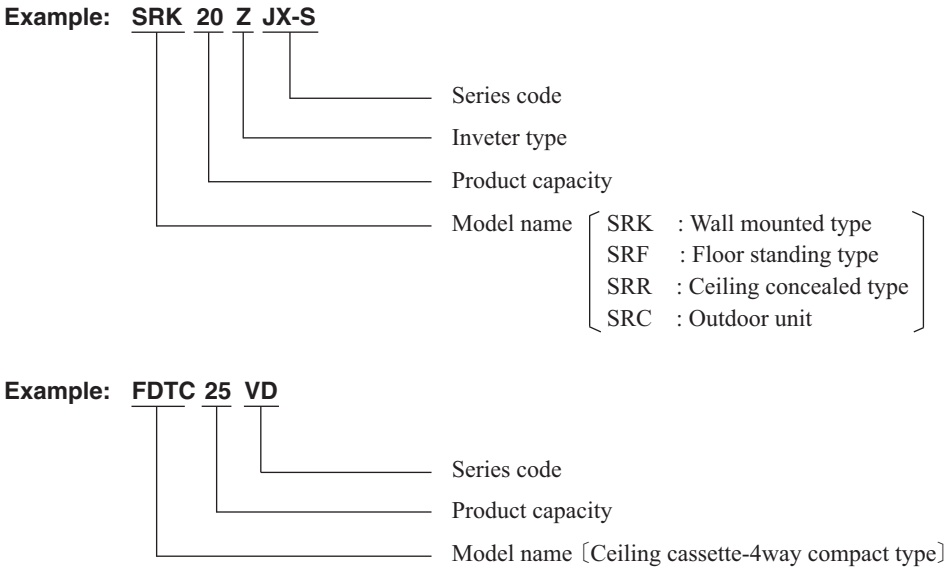
■How to read the model name



10 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

10.1 Models SRK20 ~ 50ZJ-S

(1) Operation control function by remote controller

◆ **Operation section**

FAN SPEED button

Each time the button is pressed, the ■ display is switched over in turn.

HI POWER/ECONO button

This button changes the HIGH POWER/ ECONOMY mode.

TEMPERATURE button

These buttons sets the indoor temperature. (These buttons are used for setting the current time and timer function as well.)

ON TIMER button

This button selects ON TIMER operation.

SLEEP button

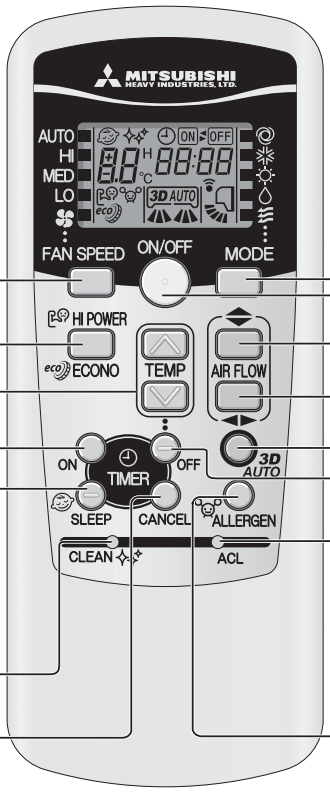
This button selects SLEEP operation.

CLEAN switch

This switch changes the CLEAN mode.

CANCEL button

This button cancels the ON timer, OFF timer, and SLEEP operation.



- The above illustration shows all controls, but in practice only the relevant parts are shown.

OPERATION MODE select button

Each time the button pressed, the ■ display is switched over in turn.

ON/OFF (luminous) button

Press to start operation, press again to stop.

AIR FLOW (UP/DOWN) button

This button changes the air flow (up/down) direction.

AIR FLOW (LEFT/RIGHT) button

This button changes the air flow (left/right) direction.

3D AUTO button

This button sets 3D AUTO operation.

OFF TIMER button

This button selects OFF TIMER operation

ACL switch

This switch is for resetting microcomputer and setting time.

ALLERGEN CLEAR button

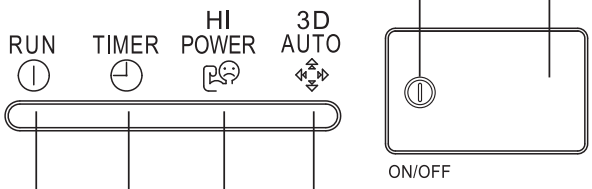
This button selects ALLERGEN CLEAR operation.

Unit display section

Remote control signal receiver

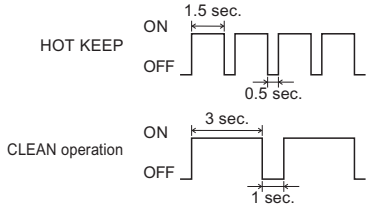
Unit ON/OFF button

This button can be used for turning on/off the unit when remote control is not available.



RUN (HOT KEEP) light (green)

- Illuminates during operation.
- Blinks when airflow stops due to the 'HOT KEEP' and 'CLEAN operation'.



3D AUTO light (green)

Illuminates during 3D AUTO operation.

HI POWER light (green)

Illuminates during HIGH POWER operation.

TIMER light (yellow)

Illuminates during TIMER operation.

(2) Unit ON/OFF button

When the remote controller batteries become weak, or if the remote controller is lost or malfunctioning, this button may be used to turn the unit on and off.

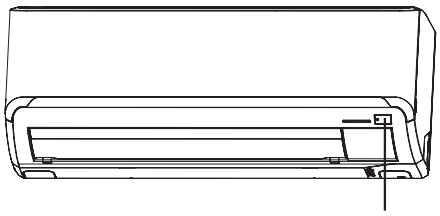
(a) Operation

Push the button once to place the unit in the automatic mode. Push it once more to turn the unit off.

(b) Details of operation

The unit will go into the automatic mode in which it automatically determines, from indoor temperature (as detected by sensor), whether to go into the cooling, thermal dry or heating modes.

Function / operation mode	Indoor temperature setting	Fan speed	Flap/Louver	Timer Switch
Cooling	About 24ºC	Auto	Auto	Continuous
Thermal dry	About 25ºC			
Heating	About 26ºC			



Unit ON/OFF button

(3) Auto restart function

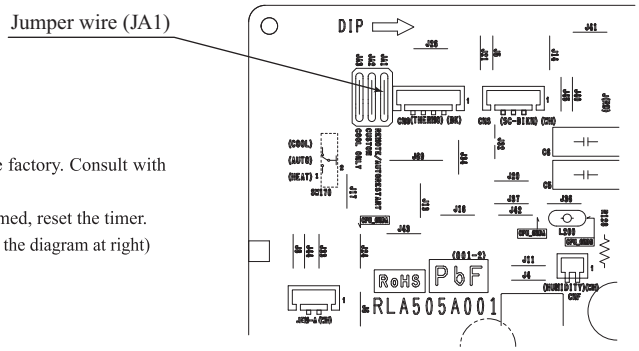
(a) Auto restart function records the operational status of the air-conditioner immediately prior to be switched off by a power cut, and then automatically resumes operations after the power has been restored.

(b) The following settings will be cancelled:

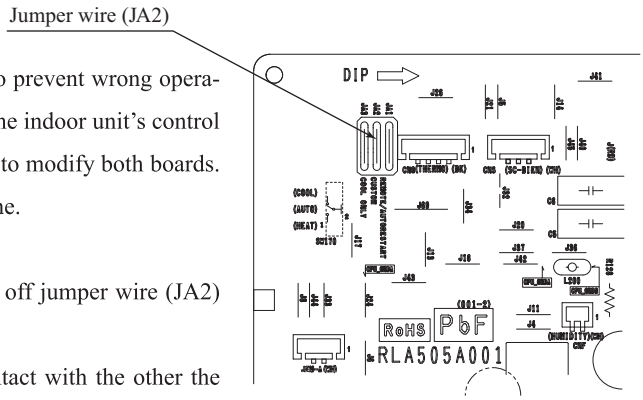
1) Timer settings

2) HIGH POWER operations

Notes (1) Auto restart function is set at on when the air-conditioner is shipped from the factory. Consult with your dealer if this function needs to be switched off.
(2) When power failure ocurrs, the timer setting is cancelled. Once power is resumed, reset the timer.
(3) If the jumper wire (JA1) "AUTO RESTART" is cut, auto restart is disabled. (See the diagram at right)



(4) Custom cord switching procedure



If two wireless remote controller are installed in one room, in order to prevent wrong operation due to mixed signals, please modify the printed circuit board in the indoor unit's control box and the remote controller using the following procedure. Be sure to modify both boards. If only one board is modified, receiving (and operation) cannot be done.

(a) Modifying the indoor printed circuit board

Take out the printed circuit board from the control box and cut off jumper wire (JA2) using wire cutters.

After cutting of the jumper wire, take measures to prevent contact with the other the lead wires, etc.

(b) Modifying the wireless remote controller

1) Remove the battery.

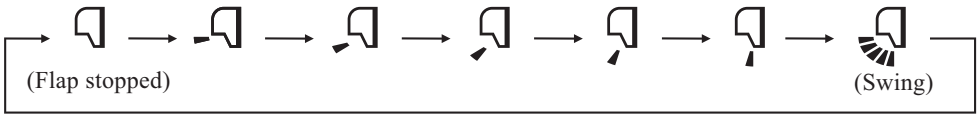
2) Cut the jumper wire shown in the figure at right.

(5) Flap and louver control

Control the flap and louver by AIR FLOW ⬍ (UP/DOWN) and ⬌ (LEFT/RIGHT) button on the wireless remote controller.

(a) Flap

Each time when you press the AIR FLOW ⬍ (UP/DOWN) button the mode changes as follows.

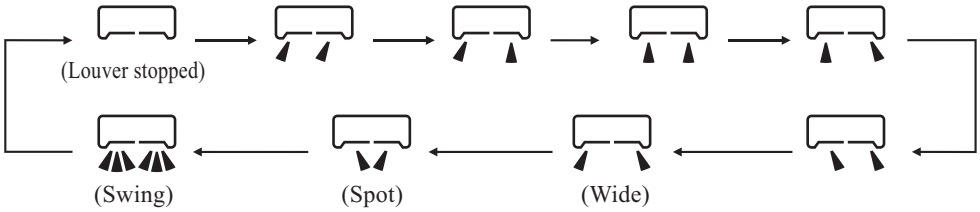


• Angle of Flap from Horizontal

Remote controller display					
COOL , DRY, FAN	Approx. 10°	Approx. 25°	Approx. 40°	Approx. 50°	Approx. 60°
HEAT	Approx. 25°	Approx. 40°	Approx. 50°	Approx. 60°	Approx. 70°

(b) Louver

Each time when you press the AIR FLOW ⬌ (LEFT/RIGHT) button the mode changes as follows.



• Angle of Louver

Remote controller display					
Center installation	Left Approx. 50°	Left Approx. 20°	Center	Right Approx. 20°	Right Approx. 50°
Right end installation	Left Approx. 50°	Left Approx. 45°	Left Approx. 30°	Center	Right Approx. 20°
Left end installation	Left Approx. 20°	Center	Right Approx. 30°	Right Approx. 45°	Right Approx. 50°

(c) Swing

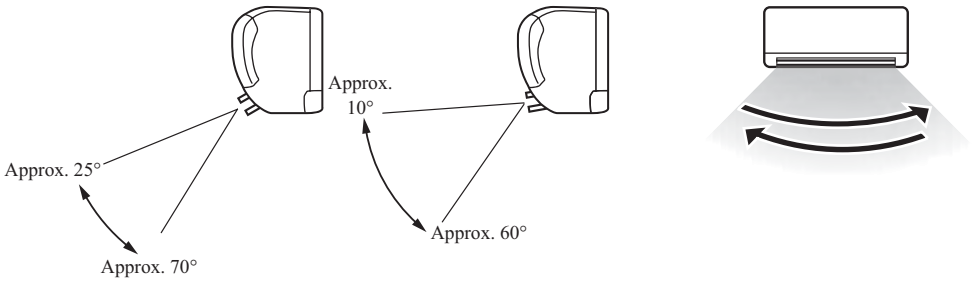
1) Swing flap

Flap moves in upward and downward directions continuously.

2) Swing louver

Louver moves in left and right directions continuously.

◆ In HEAT operation ◆ In COOL, DRY, FAN operation



(c) Memory flap (Flap or Louver stopped)

When you press the AIR FLOW (UP/DOWN or LEFT/RIGHT) button once while the flap or louver is operating, it stops swinging at the position. Since this angle is memorized in the microcomputer, the flap or louver will automatically be set at this angle when the next operation is started.

(d) When not operating

The flap returns to the position of air flow directly below, when operation has stopped.

(6) 3D auto operation

Control the flap and louver by 3D AUTO button on the wireless remote controller.

Air flow selection and air flow direction are automatically controlled, allowing the entire indoor to efficiently conditioned.

(a) During Cooling and Heating (Including auto cooling and heating)

1) Air flow selection is determined according to indoor temperature and setting temperature.

Operation mode	Air flow selection				
	AUTO		HI	MED	LO
At cooling	Indoor temp. – Setting temp. >5°C	Indoor temp. – Setting temp. ≦ 5°C	HI	MED	LO
	HIGH POWER	AUTO			
At heating	Setting temp. – Indoor temp. >5°C	Setting temp. – Indoor temp.≦ 5°C			
	HIGH POWER	AUTO			

2) Air flow direction is controlled according to the indoor temperature and setting temperature.

a) When 3D auto operation starts

	Cooling	Heating
Flap	Up/down Swing	
Louver	Wide (Fixed)	Center (Fixed)

b) When Indoor temp. – Setting temp. is ≦ 5ºC during cooling and when Setting temp. – Indoor temp. is ≦ 5ºC during heating, the system switches to the following air flow direction control. After the louver swings left and right symmetrically for 3 cycles, control is switched to the control in c).

	Cooling	Heating
Flap	Horizontal blowing (Fixed)	Slant forwardl blowing (Fixed)
Louver	Left/right Swing	

c) After the flap swings for 5 cycles, control is switched to the control in d).

	Cooling	Heating
Flap	Up/down Swing	
Louver	Center (Fixed)	

d) For 5 minutes, the following air flow direction control is carried out.

	Cooling	Heating
Flap	Horizontal blowing (Fixed)	Slant forwardl blowing (Fixed)
Louver	Wide (Fixed)	

e) After 5 minutes have passed, the air flow direction is determined according to the indoor temperature and setting temperature.

Operation mode	Air flow direction contorol		
At cooling	Indoor temp. – Setting temp. ≦ 2°C	2°C < Indoor temp. – Setting temp. ≦ 5°C	Indoor temp. – Setting temp. > 5°C
	The control in 4) continues.	Control returns to the control in 2).	Control returns to the control in 1).
At heating	Setting temp. – Indoor temp. ≦ 2°C	2°C < Setting temp. – Indoor temp. ≦ 5°C	Setting temp. – Indoor temp. > 5°C
	The control in 4) continues.	Control returns to the control in 2).	Control returns to the control in 1).

(b) During DRY Operation (including auto DRY operation)

Air flow selection	According to DRY operation.
Flap	Horizontal blowing (Fixed)
Louver	Wide (Fixed)

(7) Timer operation

(a) Comfortable timer setting (ON timer)

If the timer is set at ON when the operation select switch is set at the cooling or heating, or the cooling or heating in auto mode operation is selected, the comfortable timer starts and determines the starting time of next operation based on the initial value of 15 minutes and the relationship between the indoor temperature at the setting time (temperature of room temperature sensor) and the setting temperature.

(b) Sleep timer operation

Pressing the SLEEP button causes the temperature to be controlled with respect to the set temperature.

(c) OFF timer operation

The Off timer can be set at a specific time (in 10-minute units) within a 24-hour period.

(8) Installation location setting

When the indoor unit is installed at the end of a room, control the air flow direction so that it is not toward the side walls. If you set the remote controller installation position, keep it so that the air flow is within the range shown in the following figure.

(a) Setting

1) If the air conditioning unit is running, press the ON/OFF button to stop.

The installation location setting cannot be made while the unit is running.

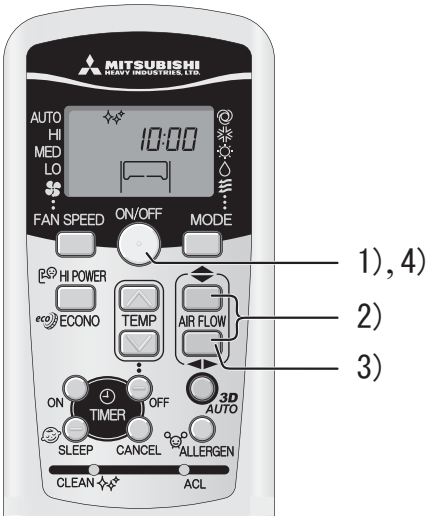
2) Press the AIR FLOW ⬍ (UP/DOWN) button and the AIR FLOW ⬌ (LEFT/RIGHT) button together for 5 seconds or more.

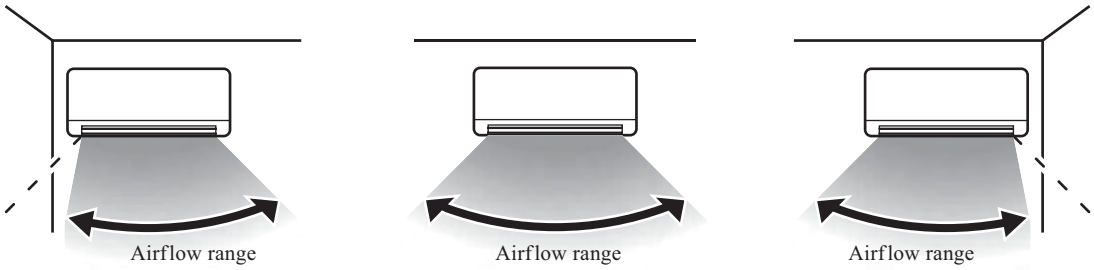
The installation location display illuminates.

3) Setting the air-conditioning installation location.

Press the AIR FLOW ⬌ (LEFT/RIGHT) button and adjust to the desired location.

Each time the AIR FLOW ⬌ (LEFT/RIGHT) button is pressed, the indicator is switched in the order of:





(Left End Installation) (Center Installation) (Right End Installation)

4) Press the ON/OFF button.

The air-conditioner's installation location is set.

Press within 60 seconds of setting the installation location (while the installation location setting display illuminates).

(9) Outline of heating operation

(a) Operation of major functional components in heating mode

	Heating		
	Thermostat ON	Thermostat OFF	Failure
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON(HOT KEEP)	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF
4-way valve	ON	ON	OFF (3 minutes ON)

(b) Details of control at each operation mode (pattern)

1) Fuzzy operation

Deviation between the indoor temperature setting correction temperature and the return air temperature is calculated in accordance with the fuzzy rule, and used for control of the air capacity and the compressor speed.

Model / Fan speed	SRK20ZJ-S	SRK25ZJ-S	SRK35ZJ-S	SRK50ZJ-S
Auto	30~115rps	30~115rps	30~115rps	23~106rps
HI	30~115rps	30~115rps	30~115rps	23~106rps
MED	30~66rps	30~72rps	30~76rps	23~78rps
LO	30~40rps	30~42rps	30~46rps	23~50rps

When the defrosting, protection device, etc. is actuated, operation is performed in the corresponding mode.

2) Hot keep operation

If the hot keep operation is selected during the heating operation, the indoor blower is controlled based on the temperature of the indoor heat exchanger (Th2) to prevent blowing of cool wind.

(c) Defrosting operation

1) Starting conditions (Defrosting operation can be started only when all of the following conditions are met.)

a) After start of heating operation

When it elapsed 45 (model 50 : 35) minutes. (Accumulated compressor operation time)

b) After end of defrosting operation

When it elapsed 45 (model 50 : 35) minutes. (Accumulated compressor operation time)

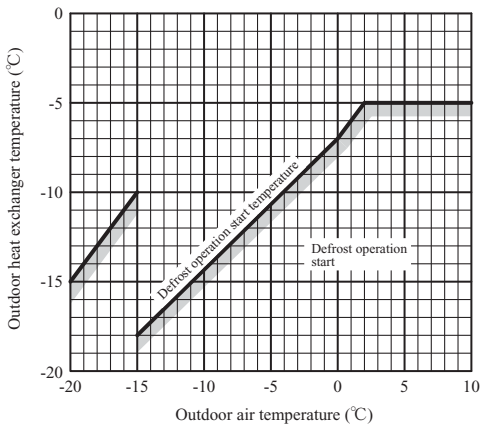
c) Outdoor heat exchanger sensor (TH1) temperature

When the temperature has been below −5ºC for 3 minutes continuously.

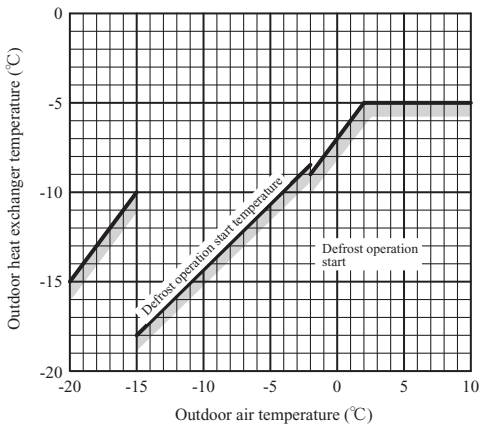
d) The difference between the outdoor air sensor temperature and the outdoor heat exchanger sensor temperature

- The outdoor air temperature ≧ 0ºC (model 50 : ≧ −2ºC) : 7ºC or higher
- −15ºC ≦ The outdoor air temperature < 0ºC (model 50 : ≧ −2ºC) : 4/15 × The outdoor air temperature + 7ºC or higher
- The outdoor air temperature < −15ºC : −5ºC or higher

Models 20～35



Model 50

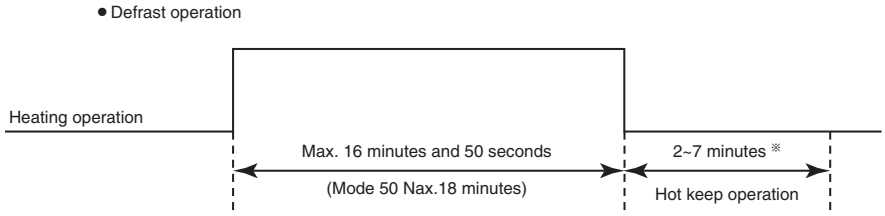


e) During continuous compressor operation
In addition, when the speed command from the indoor controller of the indoor unit during heating operation has counted 0 rps 10 times or more and all conditions of a), b), c) and e) above and the outdoor air temperature is 3ºC or less are satisfied (note that when the temperature for outdoor heat exchanger sensor (TH1) is −5ºC or less: 62 rps or more, −4ºC or less: less than 62 rps), defrost operation is started.

2) Ending conditions (Operation returns to the heating cycle when either one of the following is met.)

a) Outdoor heat exchanger sensor (TH1) temperature: 13ºC (model 50 : 10ºC) or higher

b) Continued operation time of defrosting → For more than 16 minutes and 50 seconds (model 50 : 18 minutes).



※Depends on an operation condition, the time can be longer than 7 minutes.

(10) Outline of cooling operation

(a) Operation of major functional components in Cooling mode

	Cooling		
	Thermostat ON	**Thermostat OFF**	**Failure**
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF (few minutes ON)
4-way valve	OFF	OFF	OFF

(b) Detail of control in each mode (Pattern)

1) Fuzzy operation

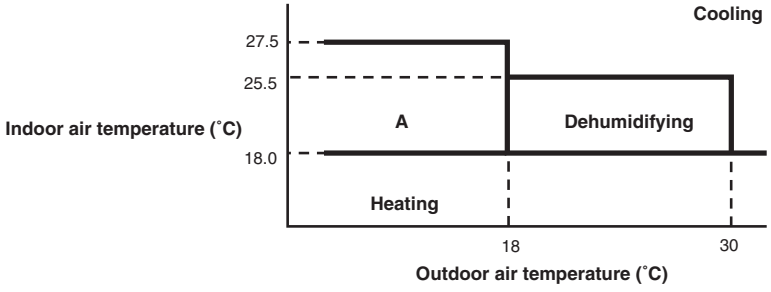
During the fuzzy operation, the air flow and the compressor speed are controlled by calculating the difference between the indoor temperature setting correction temperature and the return air temperature.

Model / Fan speed	SRK20ZJ-S	SRK25ZJ-S	SRK35ZJ-S	SRK50ZJ-S
Auto	20~66rps	20~74rps	20~98rps	23~96rps
HI	20~66rps	20~74rps	20~98rps	23~96rps
MED	20~44rps	20~55rps	20~58rps	23~62rps
LO	20~30rps	20~34rps	20~38rps	23~38rps

(11) Outline of automatic operation

(a) Determination of operation mode

The unit checks the indoor air temperature and setting temperature and the outdoor air temperature, determines the operation mode, and then begins in the automatic operation.



(b) The unit checks the temperature every hour after the start of operation and, if the result of check is not same as the previous operation mode, changes the operation mode.

1) If the setting temperature is changed with the remote controller, the operation mode is judged immediately.

2) When both the indoor and the outdoor air temperatures are in the range "A", cooling or heating is switched depending on the difference between the setting temperature and the indoor air temperature.

3) When the operation mode has been judged following the change of setting temperature with the remote controller, the hourly judgment of operation mode is cancelled.

(c) When the unit is started again within one hour after the stop of automatic operation or when the automatic operation is selected during heating, cooling or dehumidifying operation, the unit is operated in the previous operation mode.

(d) Setting temperature can be adjusted within the following range. There is the relationship as shown below between the signals of the wireless remote controller and the setting temperature.

Unit : ºC

		Signals of wireless remote controller (Display)												
		–6	–5	–4	–3	–2	–1	±0	+1	+2	+3	+4	+5	+6
Setting temperature	Cooling	18	19	20	21	22	23	24	25	26	27	28	29	30
	Dehumidifying	19	20	21	22	23	24	25	26	27	28	29	30	31
	Heating	20	21	22	23	24	25	26	27	28	29	30	31	32

(12) Protective control function

(a) Frost prevention control (During cooling or dehumidifying)

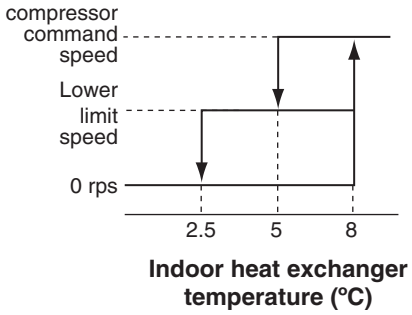
1) Operating conditions

a) Indoor heat exchanger temperature (Th2) is lower than 5ºC.

b) 5 minutes after reaching the compressor command speed except 0 rps.

2) Detail of anti-frost operation

Item \ Indoor heat exchanger temperature	5°C or lower	2.5°C or lower
Lower limit of compressor command speed	22 rps (model 50 : 23 rps)	0 rps
Indoor fan	Depends on operation mode	Protects the fan tap just before frost prevention control
Outdoor fan	Depends on command speed	Depends on stop mode
4-way valve	OFF	



Notes (1) When the indoor heat exchanger temperature is in the range of 2.5~5ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the temperature is lower than 2.5ºC, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of 5~8ºC, the compressor command speed is been maintained.

3) Reset conditions: When either of the following condition is satisfied.

a) The indoor heat exchanger temperature (Th2) is 8ºC or higher.

b) The compressor command speed is 0 rps.

(b) Cooling overload protective control

1) Operating conditions: When the outdoor air temperature (TH2) has become continuously for 30 seconds at 41ºC or more, or 47ºC or more (model 50 : 41ºC or more) with the compressor running, the lower limit speed of compressor is brought up.

Item \ Model	SRK20~35ZJ-S		SRK50ZJ-S
Outdoor air temperature	41°C or more	47°C or more	41°C or more
Lower limit speed	30 rps	40 rps	29 rps

2) Detail of operation

a) The outdoor fan is stepped up by 3 speed step. (Upper limit 7th speed.)

b) The lower limit of compressor command speed is set to 30 or 40 (model 50 : 29) rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30 or 40 (model 50 : 29) rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature is lower than 40ºC or 46ºC.

b) The compressor command speed is 0 rps.

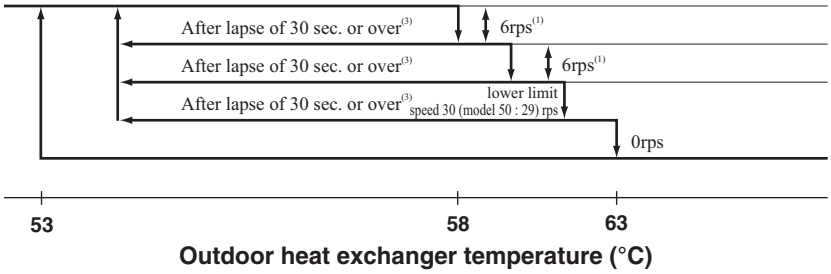
(c) Cooling high pressure control

1) Purpose: Prevents anomalous high pressure operation during cooling.

2) Detector: Outdoor heat exchanger sensor (TH1)

3) Detail of operation:

(Example) Fuzzy



Notes (1) When the outdoor heat exchanger temperature is in the range of 58~63ºC, the speed is reduced by 6 rps at each 30 seconds.
(2) When the temperature is 63ºC or higher, the compressor is stopped.
(3) When the outdoor heat exchanger temperature is in the range of 53~58ºC, if the compressor command speed is been maintained and the operation has continued for more than 30 seconds at the same speed, it returns to the normal cooling operation.

(d) Cooling low outdoor air temperature protective control

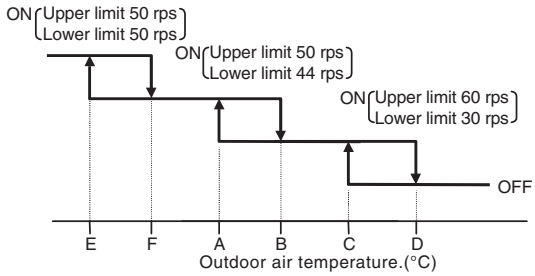
1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 20 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation:

a) The lower limit of the compressor command speed is set to 50 <44> (30) rps and even if the speed becomes lower than 50 <44> (30) rps, the speed is kept to 50 <44> (30) rps. However, when the thermo becomes OFF,the speed is reduced to 0 rps.

b) The upper limit of the compressor command speed is set to 50 <50> (60) rps and even if the calculated result becomes higher than that after fuzzy calculation, the speed is kept to 50 <50> (60) rps.

Notes (1) Values in < > are for outdoor air temperature is 0ºC or 3ºC (model 50 : 9ºC or 10ºC)
(2) Values in ( ) are for outdoor air temperature is 22ºC or 25ºC



● Values of A, B, C, D, E, F (Models 20 ~ 35)

	Outdoor air temperature (˚C)					
	E	F	A	B	C	D
First time	–8	–5	0	3	22	25
Since the seconds times	–2	1	5	8	25	28

● Values of A, B, C, D (Model 50)

	Outdoor air temperature (˚C)			
	A	B	C	D
First time	9	10	22	25
Since the second times	16	19	25	28

3) Reset conditions: When either of the following condition is satisfied

a) The outdoor air temperature (TH2) is D ºC or higher.

b) The compressor command speed is 0 rps.

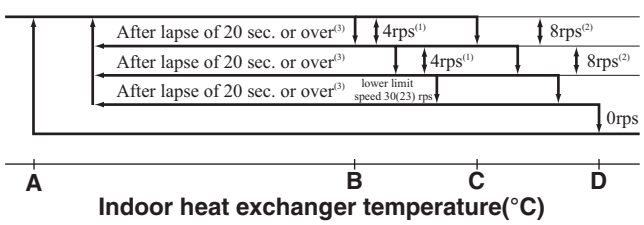
(e) Heating high pressure control

1) **Purpose:** Prevents anomalous high pressure operation during heating.

2) **Detector:** Indoor heat exchanger sensor (Th2)

3) **Detail of operation:**

(Example) Fuzzy



Note (1) Value in ( ) are for the model 50.

Notes (1) When the indoor heat exchanger temperature is in the range of B~C ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the indoor heat exchanger temperature is in the range of C~D ºC, the speed is reduced by 8 rps at each 20 seconds. When the temperature is D ºC or higher continues for 1 minute, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of A~B ºC, if the compressor command speed is been maintained and the operation has continued for more than 20 seconds at the same speed, it returns to the normal heating operation.
(4) Indoor blower retains the fan tap when it enters in the high pressure control. Outdoor blower is operated in accordance with the speed.

● **Temperature list**
Models 20 ~ 35

Unit : ºC

	A	B	C	D
RPSmin < 50	48	53	55	58
50 ≦ RPSmin < 91	48.5	56	58	61
91 ≦ RPSmin < 97	48.5	56 ~ 52.5	58	61
97 ≦ RPSmin < 100	48.5	52.5 ~ 50.8	58 ~ 56.2	61
100 ≦ RPSmin < 115	48.5 ~ 40.1	50.8 ~ 42	56.2 ~ 47.3	61
115 ≦ RPSmin	40.1	42	47.3	61

Note (1) RPSmin: The lower one between the outdoor speed and the compressor command speed

Model 50

Unit : ºC

	A	B	C	D
RPSmin < 40	49	53	55	58
40 ≦ RPSmin < 80	53	57	59	62
80 ≦ RPSmin < 90	53 ~ 47	57 ~ 51	59 ~ 53	58
90 ≦ RPSmin < 102	47 ~ 41	51 ~ 45	53 ~ 47	51
102 ≦ RPSmin	41	45	47	51

Note (1) RPSmin: The lower one between the outdoor speed and the compressor command speed

(f) Heating overload protective control

1) **Indoor unit side**

a) **Operating conditions :** When the outdoor air temperature (TH2) is 17ºC or higher continues for 30 seconds while the compressor command speed other than 0 rps.

b) **Detail of operation :** The indoor fan is stepped up by 1 speed step. (Upper limit 8th speed)

c) **Reset conditions :** The outdoor air temperature (TH2) is lower than 16ºC.

2) **Outdoor unit side**

• Models 20 ~ 35

a) **Operating conditions :** When the outdoor air temperature (TH2) is 22ºC or higher continues for 30 seconds while the compressor command speed other than 0 rps.

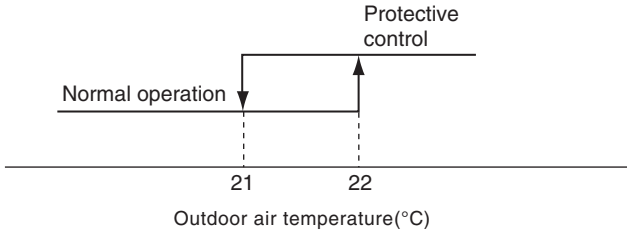
b) **Detail of operation**

i) Taking the upper limit of compressor command speed range at 60 rps, if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.

ii) The lower limit of compressor command speed is set to 40 rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 40 rps. However, when the thermo becomes OFF, the speed is reduced to 0 prs.

iii) Inching prevention control is activated and inching prevention control is carried out with the minimum speed set at 40 rps.

iv) The outdoor fan is set on 2nd speed.



c) Reset conditions: The outdoor air temperature (TH2) is lower than 21ºC.

• Model 50

a) Operating conditions : When the outdoor air temperature (TH2) is 11ºC or higher continues for 30 seconds while the compressor command speed other than 0 rps.

b) Detail of operation

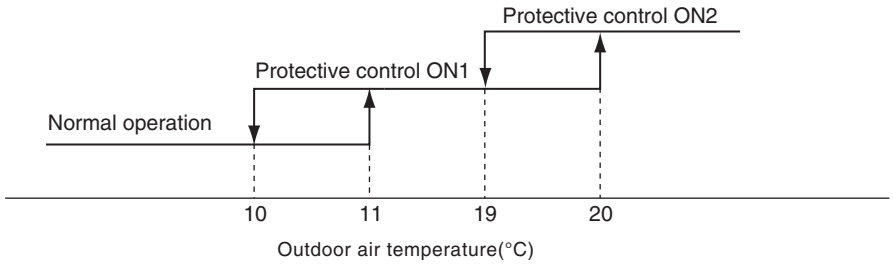
i) Taking the upper limit of compressor command speed range at 78 rps, if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.

ii) The lower limit of compressor command speed is set to 30 rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30 rps. However, when the thermo becomes OFF, the speed is reduced to 0 prs.

iii) Inching prevention control is activated and inching prevention control is carried out with the minimum speed set at 30 rps.

iv) The outdoor fan speed.

Item / Protective control	Compressor command speed		Outdoor fan speed
	Low limit	Upper limit	
NO1	30 rps	78 rps	It depends on compressor command speed
NO2	30 rps	51 rps	2nd



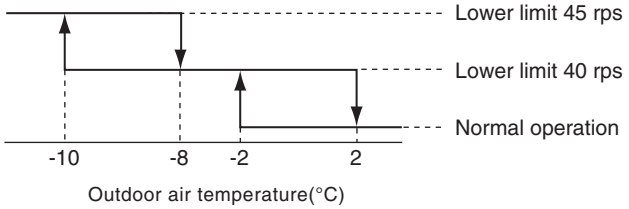
c) Reset conditions: The outdoor air temperature (TH2) is lower than 10ºC.

(g) Heating low outdoor temperature protective control

• Models 20 ~ 35

1) Operating conditions: When the outdoor air temperature (TH2) is lower than −2ºC or higher continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The lower limit compressor command speed is change as shown in the figure below.



3) Reset conditions: When either of the following condition is satisfied.

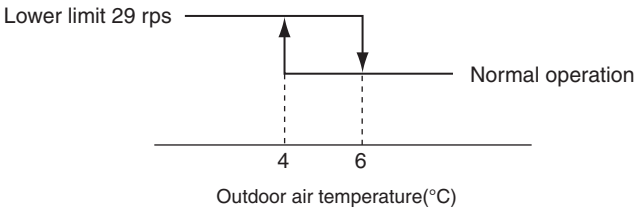
a) The outdoor air temperature (TH2) becomes −2ºC.

b) The compressor command speed is 0 rps.

• Model 50

1) Operating conditions: When the outdoor air temperature (TH2) is lower than 4ºC or higher continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The lower limit compressor command speed is change as shown in the figure belo.



3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature (TH2) becomes 6ºC.

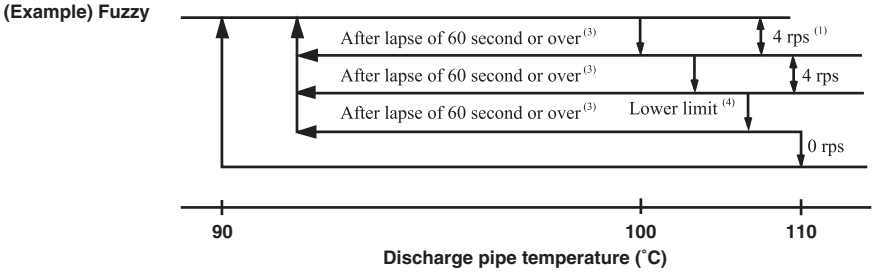
b) The compressor command speed is 0 rps.

(h) Compressor overheat protection

1) Purpose: It is designed to prevent deterioration of oil, burnout of motor coil and other trouble resulting from the compressor overheat.

2) Detail of operation

a) Speeds are controlled with temperature detected by the sensor (TH3) mounted on the discharge pipe.



Notes (1) When the discharge pipe temperature is in the range of 100~110ºC, the speed is reduced by 4 rps.

(2) When the discharge pipe temperature is raised and continues operation for 20 seconds without changing, then the speed is reduced again by 4 rps.

(3) If the discharge pipe temperature is in the range of 90~100ºC even when the compressor command speed is maintained for 60 second when the temperature is in the range of 90~100ºC, the speed is raised by 1 rps and kept at that speed for 60 second. This process is repeated until the command speed is reached.

(4) Lower limit speed

Model \ Item		Cooling	Heating
Lower limit speed	20 ~ 35	20 rps	30 rps
	50	24 rps	29 rps

b) If the temperature of 110ºC is detected by the sensor on the discharge pipe, then the compressor will stop immediately. When the discharge pipe temperature drops and the time delay of 3 minutes is over, the unit starts again within 1 hour but there is no start at the third time.

(i) Current safe

1) Purpose: Current is controlled not to exceed the upper limit of the setting operation current.

2) Detail of operation: Input current to the converter is monitored with the current sensor fixed on the printed circuit board of the outdoor unit and, if the operation current value reaches the limiting current value, the compressor command speed is reduced.

If the mechanism is actuated when the compressor command speed is less than 30 rps, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(j) Current cut

1) Purpose: Inverter is protected from overcurrent.

2) Detail of operation: Output current from the inverter is monitored with a shunt resistor and, if the current exceeds the setting value, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(k) Outdoor unit failure

This is a function for determining when there is trouble with the outdoor unit during air conditioning.
The compressor is stopped if any one of the following in item 1), 2) is satisfied. Once the unit is stopped by this function, ti is not restarted.

1) When the input current is measured at 1 A or less for 3 continuous minutes or more.
2) If the outdoor unit sends a 0 rps signal to the indoor unit 3 times or more within 20 minutes of the power being turned on.

(l) Indoor fan motor protection

When the air conditioner is operating and the indoor fan motor is turned ON, if the indoor fan motor has operated at 300 rpm or under for more than 30 seconds, the unit enters first in the stop mode and then stops the entire system.

(m) Serial signal transmission error protection

1) Purpose: Prevents malfunction resulting from error on the indoor ↔ outdoor signals.

2) Detail of operation: If the compressor is operating and a serial signal cannot be received from the indoor control with outdoor control having serial signals continues for 7 minute and 35 seconds, the compressor is stopped.
After the compressor has been stopped, it will be restarted after the compressor start delay if a serial signal can be received again from the indoor control.

(n) Rotor lock

If the motor for the compressor does not turn after it has been started, it is determined that a compressor lock has occurred and the compressor is stopped.

(o) Outdoor fan motor protection

If the outdoor fan motor has operated at 75 rpm or under for more than 30 seconds, the compressor and fan motor are stopped.

(p) Outdoor fan control at low outdoor temperature

◆ **Cooling**

1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: After the outdoor fan operates at A speed for 60 seconds; the corresponding outdoor heat exchanger temperature shall implement the following controls.

● Value of A

	Outdoor fan
Outdoor temperature > 10˚C	2nd speed
Outdoor temperature ≦ 10˚C	1st speed

a) Outdoor heat exchanger temperature (TH1) ≦ 21ºC
After the outdoor fan speed drops (down) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is lower than 21ºC, gradually reduce the outdoor fan speed by 1 speed. (Lower limit 1st speed)

b) 21ºC < Outdoor heat exchanger temperature (TH1) ≦ 38ºC
After the outdoor fan speed maintains at A speed for 20 seconds; if the outdoor heat exchanger temperature is 21ºC~ 38ºC, maintain outdoor fan speed.

c) Outdoor heat exchanger tempeature (TH1) > 38ºC
After the outdoor fan speed rises (up) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is higher than 38ºC, gradually increase outdoor fan speed by 1 speed. (Upper limit 3rd speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 25ºC or higher.

b) The compressor command speed is 0 rps.

◆ **Heating**

1) Operating conditions: When the outdoor air temperature (TH2) is 4ºC (model 50 : 0ºC) or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The outdoor fan is stepped up by 2 speed step at each 20 seconds. (Upper limit 8th speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 6ºC (model 50 : 2ºC) or higher.

b) The compressor command speed is 0 rps.

(q) Refrigeration cycle system protection

1) Starting conditions

a) When 5 minutes have elapsed after the compressor ON or the completion of the defrost control

b) Other than the defrost control

c) When, after meeting the conditions of a) and b) above, the compressor speed, indoor air temperature (Th1) and indoor heat exchanger temperature (Th2) have met the conditions in the following table for 5 minutes:

Operation mode	Compressor speed (N)	Indoor air temperature (Th1)	Indoor air temperature (Th1)/ Indoor heat exchanger temperature (Th2)
Cooling	50≦N	10≦Th1≦40	Th1−4<Th2
Heating	50≦N	0≦Th1≦40	Th2<Th1+6

2) Contents of control

a) When the conditions of 1) above are met, the compressor stops.

b) Error stop occurs when the compressor has stopped 3 times within 60 minutes.

3) Resetting condition

When the compressor has been turned OFF

10.2 Models SRK20~60ZJX-S

(1) Operation control function by remote controller

◆ Operation section

FAN SPEED button

Each time the button is pressed, the ■ display is switched over in turn.

HI POWER/ECONO button

This button changes the HIGH POWER/ ECONOMY mode.

TEMPERATURE button

These buttons sets the indoor temperature. (These buttons are used for setting the current time and timer function as well.)

ON TIMER button

This button selects ON TIMER operation.

SLEEP button

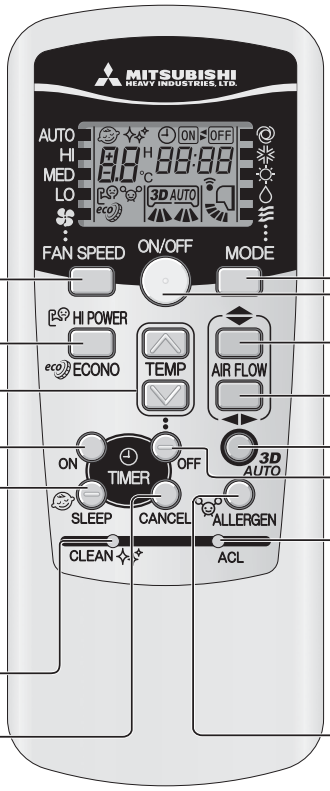
This button selects SLEEP operation.

CLEAN switch

This switch changes the CLEAN mode.

CANCEL button

This button cancels the ON timer, OFF timer, and SLEEP operation.



- The above illustration shows all controls, but in practice only the relevant parts are shown.

OPERATION MODE select button

Each time the button pressed, the ■ display is switched over in turn.

ON/OFF (luminous) button

Press to start operation, press again to stop.

AIR FLOW (UP/DOWN) button

This button changes the air flow (up/down) direction.

AIR FLOW (LEFT/RIGHT) button

This button changes the air flow (left/right) direction.

3D AUTO button

This button sets 3D AUTO operation.

OFF TIMER button

This button selects OFF TIMER operation

ACL switch

This switch is for resetting microcomputer and setting time.

ALLERGEN CLEAR button

This button selects ALLERGEN CLEAR operation.

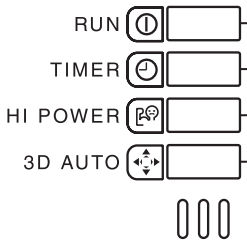
Unit indication section

Model All models

Unit ON/OFF button

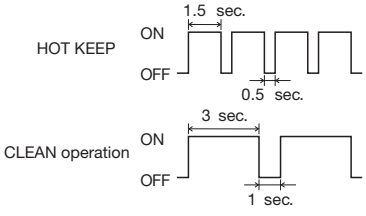
This button can be used for turning on/off the unit when remote controller is not available.

Remote controller signal receiver



RUN (HOT KEEP) light (green/blue)

- Illuminates during operation.
  green : except ECONO operation
  blue : ECONO operation
- Blinks when airflow stops due to the 'HOT KEEP' and 'CLEAN operation'.



3D AUTO light (green)

Illuminates during 3D AUTO operation

HI POWER light (green)

Illuminates during HIGH POWER operation.

TIMER light (yellow)

Illuminates during TIMER operation.

(2) Unit ON/OFF button

When the remote controller batteries become weak, or if the remote controller is lost or malfunctioning, this button may be used to turn the unit on and off.

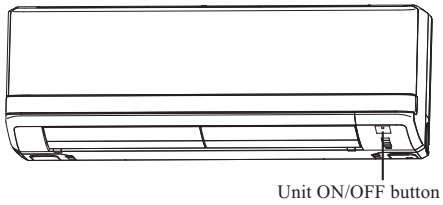
(a) Operation

Push the button once to place the unit in the automatic mode. Push it once more to turn the unit off.

(b) Details of operation

The unit will go into the automatic mode in which it automatically determines, from indoor temperature (as detected by sensor), whether to go into the cooling, thermal dry or heating modes.

Function / operation mode	Indoor temperature setting	Fan speed	Flap/Louver	Timer Switch
Cooling	About 24ºC	Auto	Auto	Continuous
Thermal dry	About 25ºC			
Heating	About 26ºC			



(3) Auto restart function

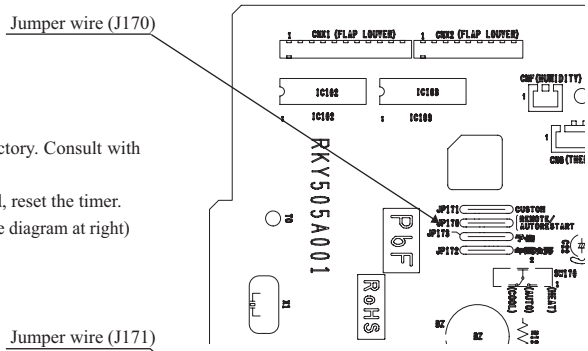
(a) Auto restart function records the operational status of the air-conditioner immediately prior to be switched off by a power cut, and then automatically resumes operations after the power has been restored.

(b) The following settings will be cancelled:

1) Timer settings

2) HIGH POWER operations

Notes (1) Auto restart function is set at on when the air-conditioner is shipped from the factory. Consult with your dealer if this function needs to be switched off.
(2) When power failure ocurrs, the timer setting is cancelled. Once power is resumed, reset the timer.
(3) If the jumper wire (J170) "AUTO RESTART" is cut, auto restart is disabled. (See the diagram at right)



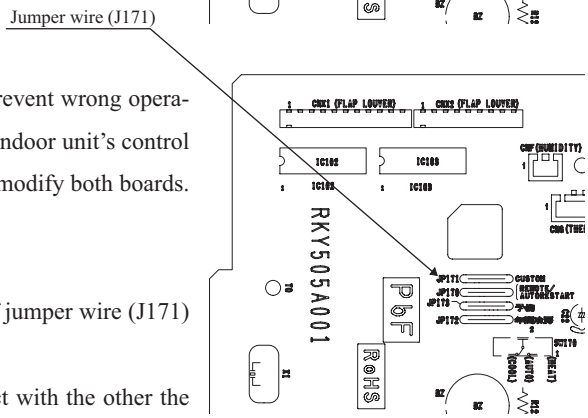
(4) Custom cord switching procedure

If two wireless remote controller are installed in one room, in order to prevent wrong operation due to mixed signals, please modify the printed circuit board in the indoor unit's control box and the remote controller using the following procedure. Be sure to modify both boards. If only one board is modified, receiving (and operation) cannot be done.

(a) Modifying the indoor printed circuit board

Take out the printed circuit board from the control box and cut off jumper wire (J171) using wire cutters.

After cutting of the jumper wire, take measures to prevent contact with the other the lead wires, etc.



(b) Modifying the wireless remote controller

1) Remove the battery.

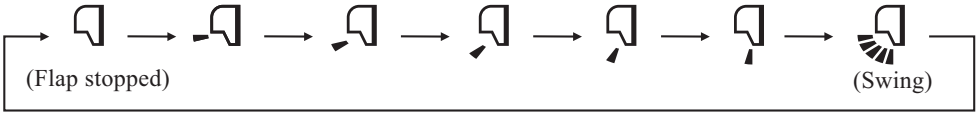
2) Cut the jumper wire shown in the figure at right.

(5) Flap and louver control

Control the flap and louver by AIRFLOW ⬍ (UP/DOWN) and ⬌ (LEFT/RIGHT) button on the wireless remote controller.

(a) Flap

Each time when you press the AIRFLOW ⬍ (UP/DOWN) button the mode changes as follows.

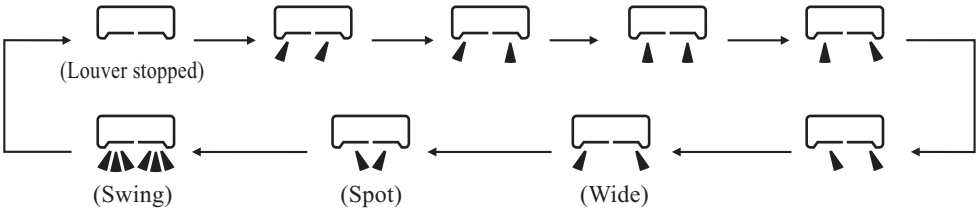


• Angle of Flap from Horizontal

Remote controller display					
COOL , DRY, FAN	Approx. 5°	Approx. 20°	Approx. 35°	Approx. 45°	Approx. 60°
HEAT	Approx. 20°	Approx. 35°	Approx. 45°	Approx. 60°	Approx. 75°

(b) Louver

Each time when you press the AIRFLOW ⬌ (LEFT/RIGHT) button the mode changes as follows.



• Angle of Louver

Remote controller display					
Center installation	Left Approx. 50°	Left Approx. 20°	Center	Right Approx. 20°	Right Approx. 50°
Right end installation	Left Approx. 50°	Left Approx. 45°	Left Approx. 30°	Center	Right Approx. 20°
Left end installation	Left Approx. 20°	Center	Right Approx. 30°	Right Approx. 45°	Right Approx. 50°

(c) Swing

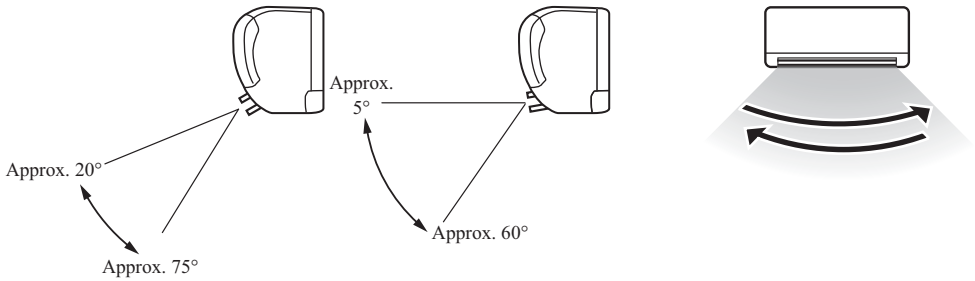
1) Swing flap

Flap moves in upward and downward directions continuously.

2) Swing louver

Louver moves in left and right directions continuously.

◆ In HEAT operation ◆ In COOL, DRY, FAN operation



(d) Memory flap (Flap or Louver stopped)

When you press the AIRFLOW (UP/DOWN or LEFT/RIGHT) button once while the flap or louver is operating, it stops swinging at the position. Since this angle is memorized in the microcomputer, the flap or louver will automatically be set at this angle when the next operation is started.

(e) When not operating

The flap returns to the position of air flow directly below, when operation has stopped.

(6) 3D auto operation

Control the flap and louver by 3D AUTO button on the wireless remote controller.

Air flow selection and air flow direction are automatically controlled, allowing the entire indoor to efficiently conditioned.

(a) During Cooling and Heating (Including auto cooling and heating)

1) Air flow selection is determined according to indoor temperature and setting temperature.

Operation mode	Air flow selection				
	AUTO		HI	MED	LO
At cooling	Indoor temp. – Setting temp. >5°C	Indoor temp. – Setting temp. ≦ 5°C	HI	MED	LO
	HIGH POWER	AUTO			
At heating	Setting temp. – Indoor temp. >5°C	Setting temp. – Indoor temp.≦ 5°C			
	HIGH POWER	AUTO			

2) Air flow direction is controlled according to the indoor temperature and setting temperature.

a) When 3D auto operation starts

	Cooling	Heating
Flap	Up/down Swing	
Louver	Wide (fixed)	Center (fixed)

b) When Indoor temp. – Setting temp. is ≦ 5ºC during cooling and when Setting temp. – Indoor temp. is ≦ 5ºC during heating, the system switches to the following air flow direction control. After the louver swings left and right symmetrically for 3 cycles, control is switched to the control in c).

	Cooling	Heating
Flap	Horizontal blowing (Fixed)	Slant forwardl blowing (Fixed)
Louver	Left/right Swing	

c) After the flap swings for 5 cycles, control is switched to the control in d).

	Cooling	Heating
Flap	Up/down Swing	
Louver	Center (Fixed)	

d) For 5 minutes, the following air flow direction control is carried out.

	Cooling	Heating
Flap	Horizontal blowing (Fixed)	Slant forwardl blowing (Fixed)
Louver	Wide (Fixed)	

e) After 5 minutes have passed, the air flow direction is determined according to the indoor temperature and setting temperature.

Operation mode	Air flow direction contorol		
At cooling	Indoor temp. – Setting temp. ≦ 2°C	2°C < Indoor temp. – Setting temp. ≦ 5°C	Indoor temp. – Setting temp. > 5°C
	The control in 4) continues.	Control returns to the control in 2).	Control returns to the control in 1).
At heating	Setting temp. – Indoor temp. ≦ 2°C	2°C < Setting temp. – Indoor temp. ≦ 5°C	Setting temp. – Indoor temp. > 5°C
	The control in 4) continues.	Control returns to the control in 2).	Control returns to the control in 1).

(b) During DRY Operation (including auto DRY operation)

Air flow selection	According to DRY operation.
Flap	Horizontal blowing (Fixed)
Louver	Wide (Fixed)

(7) Timer operation

(a) Comfortable timer setting (ON timer)

If the timer is set at ON when the operation select switch is set at the cooling or heating, or the cooling or heating in auto mode operation is selected, the comfortable timer starts and determines the starting time of next operation based on the initial value of 15 minutes and the relationship between the indoor temperature at the setting time (temperature of room temperature sensor) and the setting temperature.

(b) Sleep timer operation

Pressing the SLEEP button causes the temperature to be controlled with respect to the set temperature.

(c) OFF timer operation

The Off timer can be set at a specific time (in 10-minute units) within a 24-hour period.

(8) Installation location setting

When the indoor unit is installed at the end of a room, control the air flow direction so that it is not toward the side walls. If you set the remote controller installation position, keep it so that the air flow is within the range shown in the following figure.

(a) Setting

1) If the air conditioning unit is running, press the ON/OFF button to stop.

The installation location setting cannot be made while the unit is running.

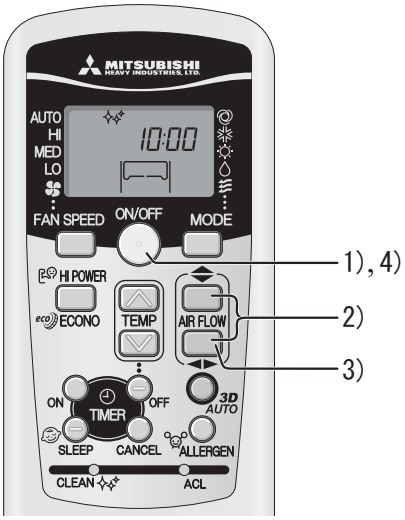
2) Press the AIR FLOW ⬍ (UP/DOWN) button and the AIRFLOW ⬌ (LEFT/RIGHT) button together for 5 seconds or more.

The installation location display illuminates.

3) Setting the air-conditioning installation location.

Press the AIR FLOW ⬌ (LEFT/RIGHT) button and adjust to the desired location.

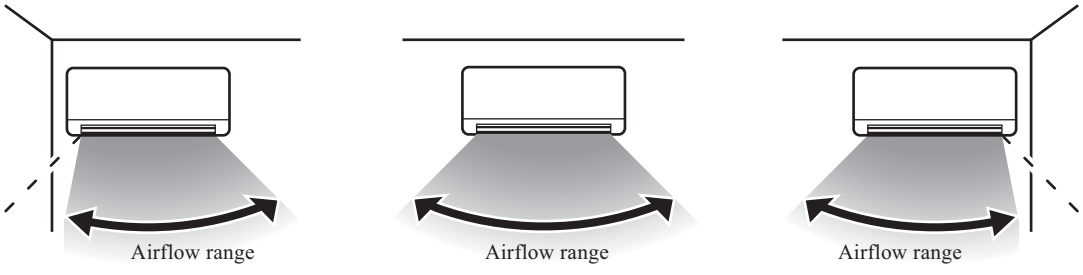
Each time the AIR FLOW ⬌ (LEFT/RIGHT) button is pressed, the indicator is switched in the order of:



4) Press the ON/OFF button.

The air-conditioner's installation location is set.

Press within 60 seconds of setting the installation location (while the installation location setting display illuminates).



(Left End Installation) (Center Installation) (Right End Installation)

(9) Outline of heating operation

(a) Operation of major functional components in heating mode

	Heating		
	Thermostat ON	Thermostat OFF	Failure
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON(HOT KEEP)	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF
4-way valve	ON	ON	OFF (3 minutes ON)

(b) Details of control at each operation mode (pattern)

1) Fuzzy operation

Deviation between the indoor temperature setting correction temperature and the return air temperature is calculated in accordance with the fuzzy rule, and used for control of the air capacity and the compressor speed.

Model / Fan speed	SRK20ZJX-S	SRK25ZJX-S	SRK35ZJX-S	SRK50ZJX-S	SRK60ZJX-S
Auto	30~94rps	30~102rps	30~115rps	12~106rps	12~120rps
HI	30~94rps	30~102rps	30~115rps	12~106rps	12~120rps
MED	30~66rps	30~72rps	30~76rps	12~74rps	12~90rps
LO	30~40rps	30~42rps	30~46rps	12~42rps	12~58rps

When the defrosting, protection device, etc. is actuated, operation is performed in the corresponding mode.

2) Hot keep operation

If the hot keep operation is selected during the heating operation, the indoor blower is controlled based on the temperature of the indoor heat exchanger (Th2) to prevent blowing of cool wind.

(c) Defrosting operation

1) Starting conditions (Defrosting operation can be started only when all of the following conditions are met.)

a) After start of heating operation

When it elapsed 45 (model 50, 60 : 35) minutes. (Accumulated compressor operation time)

b) After end of defrosting operation

When it elapsed 45 (model 50, 60 : 35) minutes. (Accumulated compressor operation time)

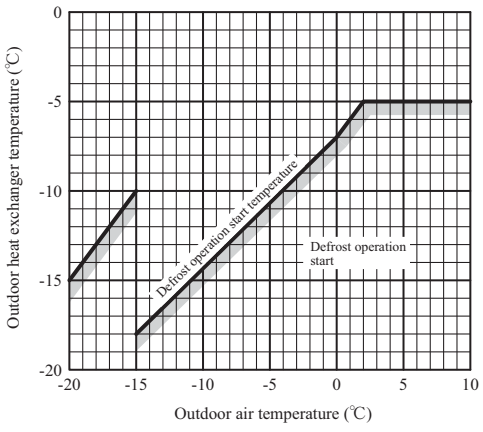
c) Outdoor heat exchanger sensor (TH1) temperature

When the temperature has been below −5ºC for 3 minutes continuously.

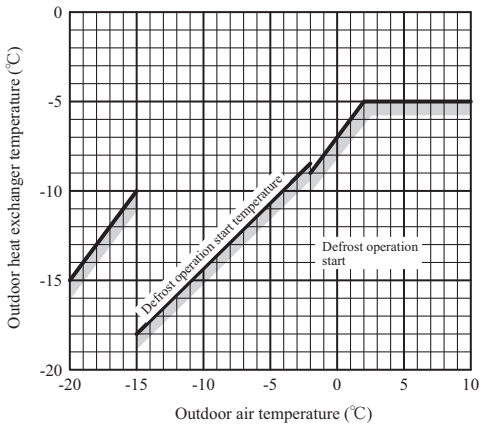
d) The difference between the outdoor air sensor temperature and the outdoor heat exchanger sensor temperature

- The outdoor air temperature ≧ 0ºC (model 50, 60 : ≧ −2ºC) : 7ºC or higher
- −15ºC ≦ The outdoor air temperature < 0ºC (model 50, 60 : < −2ºC) : 4/15 × The outdoor air temperature + 7ºC or higher
- The outdoor air temperature < −15ºC : −5ºC or higher

Models 20～35



Models 50, 60



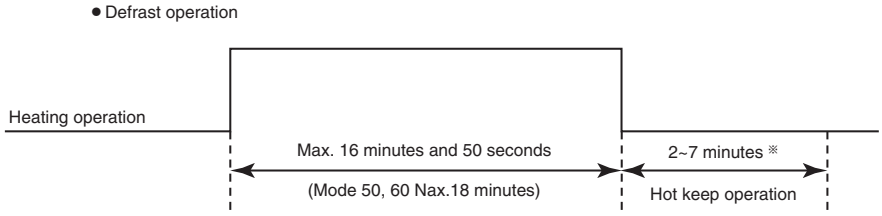
e) During continuous compressor operation

In addition, when the speed command from the indoor controller of the indoor unit during heating operation has counted 0 rps 10 times or more and all conditions of a), b), c) and e) above and the outdoor air temperature is 3ºC or less are satisfied (note that when the temperature for outdoor heat exchanger sensor (TH1) is −5ºC or less: 62 rps or more, −4ºC or less: less than 62 rps), defrost operation is started.

2) Ending conditions (Operation returns to the heating cycle when either one of the following is met.)

a) Outdoor heat exchanger sensor (TH1) temperature: 13ºC (model 50, 60 : 10ºC) or higher

b) Continued operation time of defrosting → For more than 16 minutes and 50 seconds (model 50, 60 : 18 minutes).



※Depends on an operation condition, the time can be longer than 7 minutes.

(10) Outline of cooling operation

(a) Operation of major functional components in Cooling mode

	Cooling		
	Thermostat ON	**Thermostat OFF**	**Failure**
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF (few minutes ON)
4-way valve	OFF	OFF	OFF

(b) Detail of control in each mode (Pattern)

1) Fuzzy operation

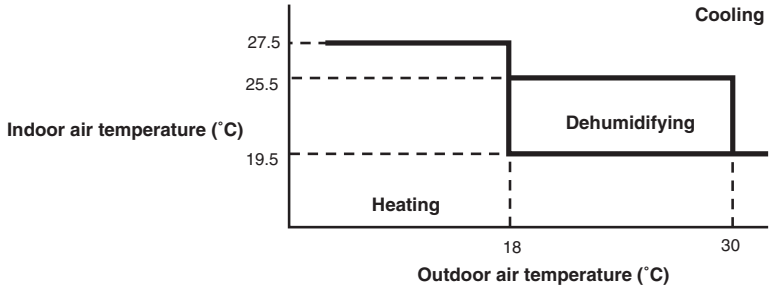
During the fuzzy operation, the air flow and the compressor speed are controlled by calculating the difference between the indoor temperature setting correction temperature and the return air temperature.

Model / Fan speed	SRK20ZJX-S	SRK25ZJX-S	SRK35ZJX-S	SRK50ZJX-S	SRK60ZJX-S
Auto	20~65rps	20~74rps	20~86rps	12~86rps	12~110rps
HI	20~65rps	20~74rps	20~86rps	12~86rps	12~110rps
MED	20~44rps	20~55rps	20~58rps	12~62rps	12~86rps
LO	20~30rps	20~34rps	20~38rps	12~34rps	12~48rps

(11) Outline of automatic operation

(a) Determination of operation mode

The unit checks the indoor air temperature and the outdoor air temperature, determines the operation mode, and then begins in the automatic operation.



(b) The unit checks the temperature every hour after the start of operation and, if the result of check is not same as the previous operation mode, changes the operation mode.

(c) When the unit is started again within one hour after the stop of automatic operation or when the automatic operation is selected during heating, cooling or dehumidifying operation, the unit is operated in the previous operation mode.

(d) Setting temperature can be adjusted within the following range. There is the relationship as shown below between the signals of the wireless remote controller and the setting temperature.

Unit : ºC

		Signals of wireless remote controller (Display)												
		–6	–5	–4	–3	–2	–1	±0	+1	+2	+3	+4	+5	+6
Setting temperature	Cooling	18	19	20	21	22	23	24	25	26	27	28	29	30
	Dehumidifying	19	20	21	22	23	24	25	26	27	28	29	30	31
	Heating	20	21	22	23	24	25	26	27	28	29	30	31	32

(12) Protective control function

(a) Frost prevention control (During cooling or dehumidifying)

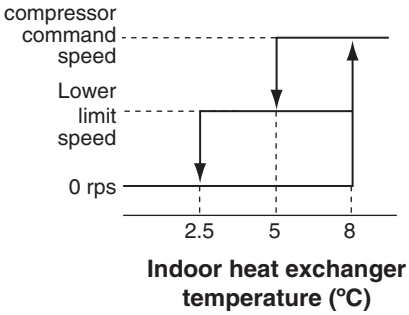
1) Operating conditions

a) Indoor heat exchanger temperature (Th2) is lower than 5ºC.

b) 5 minutes after reaching the compressor command speed except 0 rps.

2) Detail of anti-frost operation

Item \ Indoor heat exchanger temperature	5°C or lower	2.5°C or lower
Lower limit of compressor command speed	22 rps (model 50, 60 : 25 rps)	0 rps
Indoor fan	Depends on operation mode	Protects the fan tap just before frost prevention control
Outdoor fan	Depends on command speed	Depends on stop mode
4-way valve	OFF	



Notes (1) When the indoor heat exchanger temperature is in the range of 2.5~5ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the temperature is lower than 2.5ºC, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of 5~8ºC, the compressor command speed is been maintained.

3) Reset conditions: When either of the following condition is satisfied.

a) The indoor heat exchanger temperature (Th2) is 8ºC or higher.

b) The compressor command speed is 0 rps.

(b) Cooling overload protective control

1) Operating conditions: When the outdoor air temperature (TH2) has become continuously for 30 seconds at 41ºC or more, or 47ºC or more (Models 50, 60: 41ºC or more) with the compressor running, the lower limit speed of compressor is brought up.

Item \ Model	SRK20~35ZJX-S		SRK50, 60ZJX-S
Outdoor air temperature	41°C or more	47°C or more	41°C or more
Lower limit speed	30 rps	40 rps	30 rps

2) Detail of operation

a) The outdoor fan is stepped up by 3 speed step. (Upper limit 7th (models 50, 60 : 8th) speed.)

b) The lower limit of compressor command speed is set to 30 or 40 (models 50, 60 : 30) rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30 or 40 (models 50, 60 : 30) rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature is lower than 40ºC or 46ºC.

b) The compressor command speed is 0 rps.

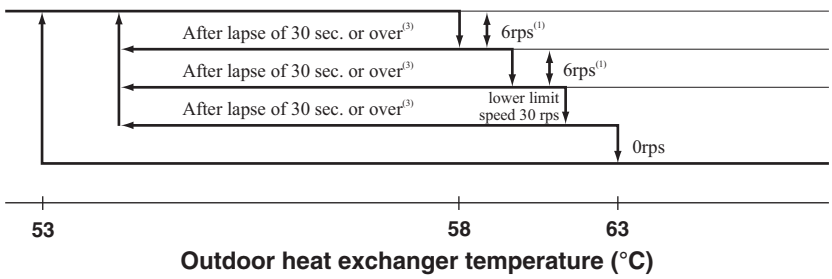
(c) Cooling high pressure control

1) Purpose: Prevents anomalous high pressure operation during cooling.

2) Detector: Outdoor heat exchanger sensor (TH1)

3) Detail of operation:

(Example) Fuzzy



Notes (1) When the outdoor heat exchanger temperature is in the range of 58~63ºC, the speed is reduced by 6 rps at each 30 seconds.
(2) When the temperature is 63ºC or higher, the compressor is stopped.
(3) When the outdoor heat exchanger temperature is in the range of 53~58ºC, if the compressor command speed is been maintained and the operation has continued for more than 30 seconds at the same speed, it returns to the normal cooling operation.

(d) Cooling low outdoor temperature protective control

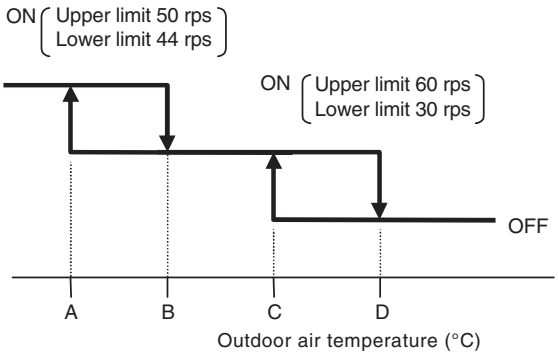
1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 20 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation:

a) The lower limit of the compressor command speed is set to 44 (30) rps and even if the speed becomes lower than 44 (30) rps, the speed is kept to 44 (30) rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

b) The upper limit of the compressor command speed is set to 50 (60) rps and even if the calculated result becomes higher than that after fuzzy calculation, the speed is kept to 50 (60) rps.

Note (1) Values in ( ) are for outdoor air temperature is 22ºC or 25ºC



- Values of A, B, C, D

	Outdoor air temp. (˚C)			
	A	**B**	**C**	**D**
First time	0	3	22	25
Since the seconds times	7	10	25	28

3) Reset conditions: When either of the following condition is satisfied

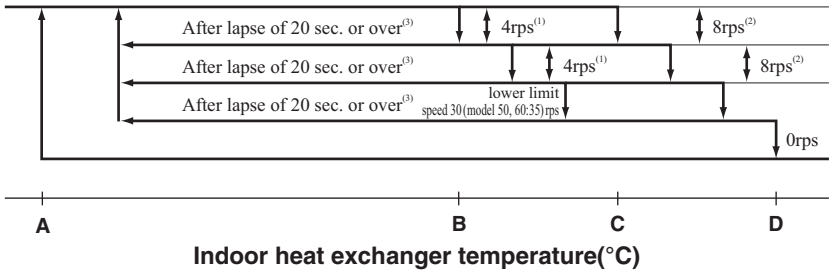
a) The outdoor air temperature (TH2) is D ºC or higher.

b) The compressor command speed is 0 rps.

(e) Heating high pressure control

1) **Purpose:** Prevents anomalous high pressure operation during heating.
2) **Detector:** Indoor heat exchanger sensor (Th2)
3) **Detail of operation:**

(Example) Fuzzy



Notes (1) When the indoor heat exchanger temperature is in the range of B~C ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the indoor heat exchanger temperature is in the range of C~D ºC, the speed is reduced by 8 rps at each 20 seconds. When the temperature is D ºC or higher continues for 1 minute, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of A~B ºC, if the compressor command speed is been maintained and the operation has continued for more than 20 seconds at the same speed, it returns to the normal heating operation.
(4) Indoor blower retains the fan tap when it enters in the high pressure control. Outdoor blower is operated in accordance with the speed.

- **Temperature list**

Models 20~35

Unit : ºC

	A	B	C	D
RPSmin < 50	48	53	55	58
50 ≦ RPSmin < 95	48.5	56	58	61
95 ≦ RPSmin < 97	48.5	56 ~ 55.5	58	61
97 ≦ RPSmin < 104	48.5	55.5 ~ 51.5	58 ~ 53.5	61
104 ≦ RPSmin < 115	48.5 ~ 42.1	51.5 ~ 44	53.5 ~ 47.3	61
115 ≦ RPSmin	42.1	44	47.3	61

Note (1) RPSmin: The lower one between the outdoor speed and the compressor command speed

Models 50, 60

Unit : ºC

	A	B	C	D
RPSmin < 88	48.5	56	58	61
88 ≦ RPSmin < 108	44	51.5	53.5	56.5
108 ≦ RPSmin	39	46.5	48.5	51.5

Note (1) RPSmin: The lower one between the outdoor speed and the compressor command speed

(f) Heating overload protective control

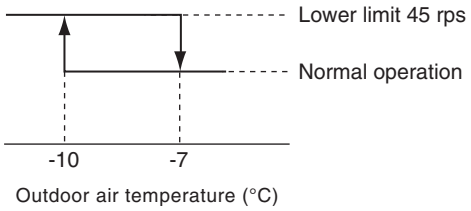
1) **Operating conditions :** When the outdoor air temperature (TH2) is 22ºC (model 50, 60 : 17ºC) or higher continues for 30 seconds while the compressor command speed other than 0 rps.
2) **Detail of operation:**
   a) Taking the upper limit of compressor command speed range at 60 rps (model 50, 60 : 50 rps), if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.
   b) The lower limit of compressor command speed is set to 40 rps (model 50, 60 : 35 rps) and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 40 rps (model 50, 60 : 35 rps). However, when the thermo becomes OFF, the speed is reduced to 0 prs.
   c) Inching prevention control is activated and inching prevention control is carried out with the minimum speed set at 40 rps (model 50, 60 : 35 rps).
   d) The outdoor fan is set on 2nd speed.
   e) The indoor fan is stepped up by 1 speed step. (Upper limit 8th speed)
3) **Reset conditions:** The outdoor air temperature (TH2) is lower than 21ºC (model 50, 60 : 16ºC).

(g) Heating low outdoor temperature protective control

• Model 20~35

1) Operating conditions: When the outdoor air temperature (TH2) is lower than −10ºC or higher continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The lower limit compressor command speed is change as shown in the figure below.



3) Reset conditions: When either of the following condition is satisfied.

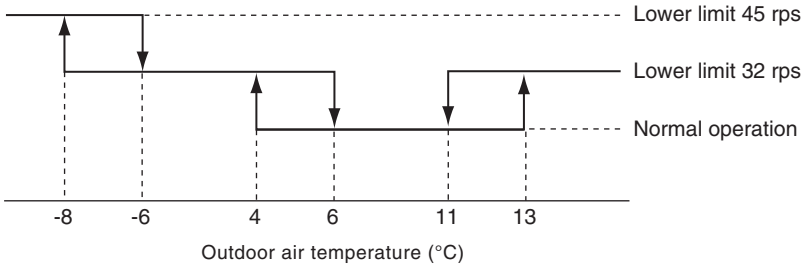
a) The outdoor air temperature (TH2) becomes −7ºC.

b) The compressor command speed is 0 rps.

• Model 50, 60

1) Operating conditions: When the outdoor air temperature (TH2) is lower than 4ºC or 13ºC or higher continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The lower limit compressor command speed is change as shown in the figure below.



3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature (TH2) becomes 6ºC ~ 11ºC.

b) The compressor command speed is 0 rps.

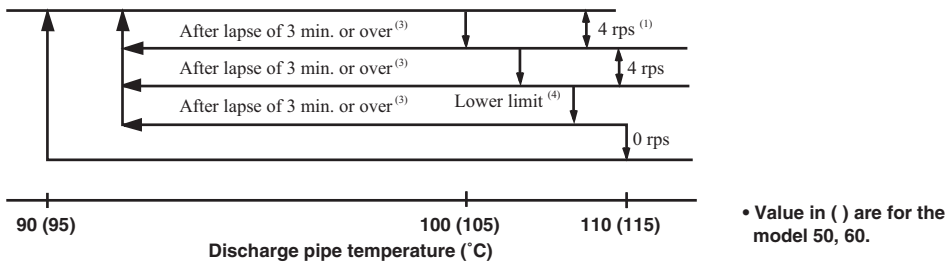
(h) Compressor overheat protection

1) Purpose: It is designed to prevent deterioration of oil, burnout of motor coil and other trouble resulting from the compressor overheat.

2) Detail of operation

a) Speeds are controlled with temperature detected by the sensor mounted on the discharge pipe.

(Example) Fuzzy


After lapse of 3 min. or over (3)
4 rps (1)
After lapse of 3 min. or over (3)
4 rps
After lapse of 3 min. or over (3)
Lower limit (4)
0 rps
90 (95)
100 (105)
110 (115)
Discharge pipe temperature (˚C)
• Value in ( ) are for the model 50, 60.

Notes (1) When the discharge pipe temperature is in the range of 100~110ºC (model 50, 60 : 105~115ºC), the speed is reduced by 4 rps.

(2) When the discharge pipe temperature is raised and continues operation for 20 seconds without changing, then the speed is reduced again by 4 rps.

(3) If the discharge pipe temperature is in the range of 90~100ºC (model 50, 60 : 95~105ºC) even when the compressor command speed is maintained for 3 minutes when the temperature is in the range of 90~100ºC (model 50, 60 : 95~105ºC), the speed is raised by 1 rps and kept at that speed for 3 minutes. This process is repeated until the command speed is reached.

(4) Lower limit speed

Model \ Item		Cooling	Heating
Lower Limit Speed	20~35	20 rps	30 rps
	50, 60	25 rps	32 rps

b) If the temperature of 110ºC (models 50, 60 : 115ºC) is detected by the sensor on the discharge pipe, then the compressor will stop immediately.
When the discharge pipe temperature drops and the time delay of 3 minutes is over, the unit starts again within 1 hour but there is no start at the third time.

(i) Current safe

1) Purpose: Current is controlled not to exceed the upper limit of the setting operation current.

2) Detail of operation: Input current to the converter is monitored with the current sensor fixed on the printed circuit board of the outdoor unit and, if the operation current value reaches the limiting current value, the compressor command speed is reduced.
If the mechanism is actuated when the compressor command speed is less than 30 rps, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(j) Current cut

1) Purpose: Inverter is protected from overcurrent.

2) Detail of operation: Output current from the inverter is monitored with a shunt resistor and, if the current exceeds the setting value, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(k) Outdoor unit failure

This is a function for determining when there is trouble with the outdoor unit during air conditioning.
The compressor is stopped if any one of the following in item 1), 2) is satisfied. Once the unit is stopped by this function, it is not restarted.

1) When the input current is measured at 1 A or less for 3 continuous minutes or more.
2) If the outdoor unit sends a 0 rps signal to the indoor unit 3 times or more within 20 minutes of the power being turned on.

(l) Indoor fan motor protection

When the air conditioner is operating and the indoor fan motor is turned ON, if the indoor fan motor has operated at 300 rpm or under for more than 30 seconds, the unit enters first in the stop mode and then stops the entire system.

(m) Serial signal transmission error protection

1) Purpose: Prevents malfunction resulting from error on the indoor ↔ outdoor signals.

2) Detail of operation: If the compressor is operating and a serial signal cannot be received from the indoor control with outdoor control having serial signals continues for 7 minute and 35 seconds, the compressor is stopped.
After the compressor has been stopped, it will be restarted after the compressor start delay if a serial signal can be received again from the indoor control.

(n) Rotor lock

If the motor for the compressor does not turn after it has been started, it is determined that a compressor lock has occurred and the compressor is stopped.

(o) Outdoor fan motor protection

If the outdoor fan motor has operated at 75 rpm or under for more than 30 seconds, the compressor and fan motor are stopped.

(p) Outdoor fan control at low outdoor temperature

◆ **Cooling**

1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: After the outdoor fan operates at A speed for 60 seconds; the corresponding outdoor heat exchanger temperature shall implement the following controls.

● Value of A

	Outdoor fan
Outdoor temperature > 10˚C	2nd speed
Outdoor temperature ≦ 10˚C	1st speed

a) Outdoor heat exchanger temperature ≦ 21ºC
After the outdoor fan speed drops (down) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is lower than 21ºC, gradually reduce the outdoor fan speed by 1 speed. (Lower limit 1st speed)

b) 21ºC < Outdoor heat exchanger temperature ≦ 38ºC
After the outdoor fan speed maintains at A speed for 20 seconds; if the outdoor heat exchanger temperature is 21ºC~ 38ºC, maintain outdoor fan speed.

c) Outdoor heat exchanger tempeature > 38ºC
After the outdoor fan speed rises (up) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is higher than 38ºC, gradually increase outdoor fan speed by 1 speed. (Upper limit 3rd speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 25ºC or higher.

b) The compressor command speed is 0 rps.

◆ **Heating**

1) Operating conditions: When the outdoor air temperature (TH2) is 4ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The outdoor fan is stepped up by 2 speed step at each 20 seconds. (Upper limit 8th speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 6ºC or higher.

b) The compressor command speed is 0 rps.

(q) Refrigeration cycle system protection

1) Starting conditions

a) When 5 minutes have elapsed after the compressor ON or the completion of the defrost control

b) Other than the defrost control

c) When, after meeting the conditions of a) and b) above, the compressor speed, indoor air temperature (Th1) and indoor heat exchanger temperature (Th2) have met the conditions in the following table for 5 minutes:

Operation mode	Compressor speed (N)	Indoor air temperature (Th1)	Indoor air temperature (Th1)/ Indoor heat exchanger temperature (Th2)
Cooling	50(40)≦N	10≦Th1≦40	Th1−4<Th2
Heating	50(40)≦N	0≦Th1≦40	Th2<Th1+6

Note (1) Value in ( ) are for the model 50, 60.

2) Contents of control

a) When the conditions of 1) above are met, the compressor stops.

b) Error stop occurs when the compressor has stopped 3 times within 60 minutes.

3) Resetting condition

When the compressor has been turned OFF

10.3 Models SRF25~50ZJX-S

(1) Operation control function by remote controller

Operation section

Model All models

FAN SPEED button

Each time the button is pressed, the ■ display is switched over in turn.

HI POWER/ECONO button

This button changes the HIGH POWER/ ECONOMY mode.

TEMPERATURE button

These buttons set the indoor temperature. (These buttons are used for setting the current time and timer function as well.)

ON TIMER button

This button selects ON TIMER operation.

SLEEP button

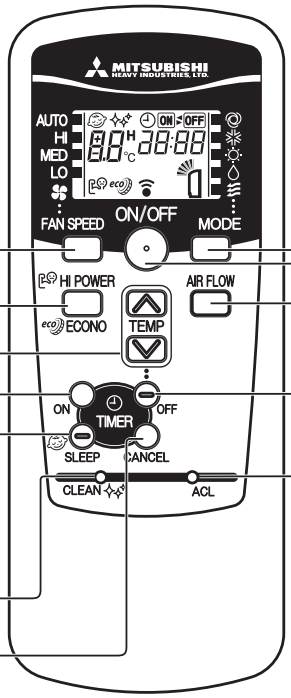
This button selects SLEEP operation.

CLEAN switch

This switch selects the CLEAN mode.

CANCEL button

This button cancels the ON timer, OFF timer, and SLEEP operation.



OPERATION MODE select button

Each time the button pressed, the ■ display is switched over in turn.

ON/OFF (luminous) button

Press to start operation, press again to stop.

AIR FLOW (UP/DOWN) button

This button changes the air flow (up/down) direction.

OFF TIMER button

This button selects OFF TIMER operation.

ACL switch

This switch is for resetting microcomputer and setting time.

- The above illustration shows all controls, but in practice only the relevant parts are shown.

Unit display section

Model All models

Unit ON/OFF button

This button can be used for turning on/off the unit when remote controller is not available.

HI POWER Light (green)

Illuminates during HIGH POWER operation.

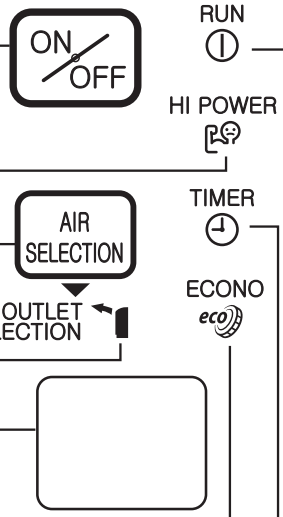
AIR SELECTION button

Use this button to switch between the combination of upper and lower air outlets and upper air outlet.

AIR OUTLET SELECTION light (green)

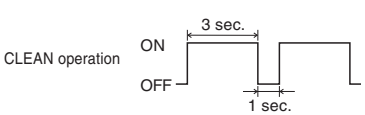
Illuminates during upper air outlet operation.

Remote controller signal receiver



RUN (HOT KEEP) light (green)

- Illuminates during operation.
- Blinks when airflow stops due to the 'HOT KEEP' and 'CLEAN operation'.



TIMER light (yellow)

Illuminates during TIMER operation.

ECONO light (green)

Illuminates during ECONOMY operation.

(2) Unit ON/OFF button

When the remote controller batteries become weak, or if the remote controller is lost or malfunctioning, this button may be used to turn the unit on and off.

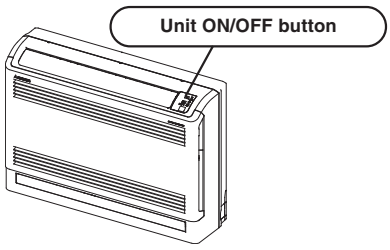
(a) Operation

Push the button once to place the unit in the automatic mode. Push it once more to turn the unit off.

(b) Details of operation

The unit will go into the automatic mode in which it automatically determines, from indoor temperature (as detected by sensor), whether to go into the cooling, thermal dry or heating modes.

Function / operation mode	Indoor temperature setting	Fan speed	Flap/Louver	Timer Switch
Cooling	About 24ºC	Auto	Auto	Continuous
Thermal dry	About 25ºC			
Heating	About 26ºC			



(3) Auto restart function

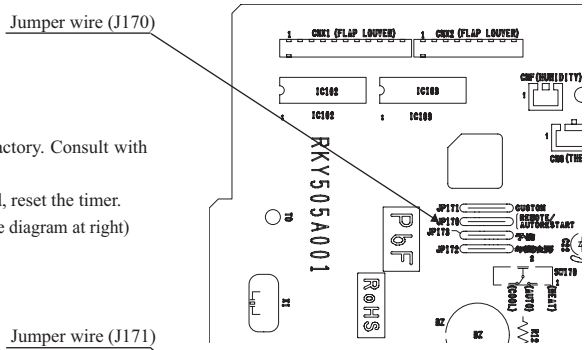
(a) Auto restart function records the operational status of the air-conditioner immediately prior to be switched off by a power cut, and then automatically resumes operations after the power has been restored.

(b) The following settings will be cancelled:

1) Timer settings

2) HIGH POWER operations

Notes (1) Auto restart function is set at on when the air-conditioner is shipped from the factory. Consult with your dealer if this function needs to be switched off.
(2) When power failure ocurrs, the timer setting is cancelled. Once power is resumed, reset the timer.
(3) If the jumper wire (J170) "AUTO RESTART" is cut, auto restart is disabled. (See the diagram at right)



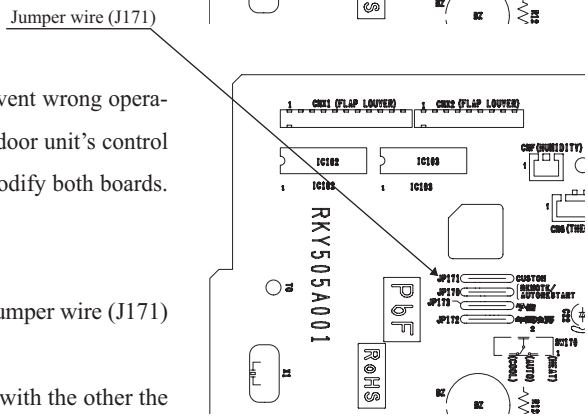
(4) Custom cord switching procedure

If two wireless remote controller are installed in one room, in order to prevent wrong operation due to mixed signals, please modify the printed circuit board in the indoor unit's control box and the remote controller using the following procedure. Be sure to modify both boards. If only one board is modified, receiving (and operation) cannot be done.

(a) Modifying the indoor printed circuit board

Take out the printed circuit board from the control box and cut off jumper wire (J171) using wire cutters.

After cutting of the jumper wire, take measures to prevent contact with the other the lead wires, etc.



(b) Modifying the wireless remote controller

1) Remove the battery.

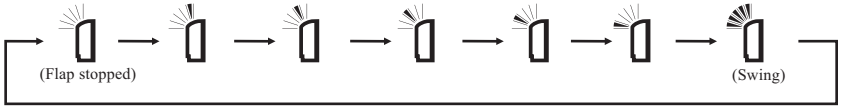
2) Cut the jumper wire shown in the figure at right.

(5) Flap control

Control the flap by AIRFLOW ⬍ (UP/DOWN) button on the wireless remote controller.

(a) Flap

Each time when you press the AIRFLOW ⬍ (UP/DOWN) button the mode changes as follows.



• Angle of Flap from Horizontal

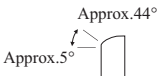
Remote controller display					
COOL , DRY, FAN	Approx. 60°	Approx. 50°	Approx. 38°	Approx. 21.5°	Approx. 12°
HEAT	Approx. 44°	Approx. 32°	Approx. 21.5°	Approx. 12°	Approx. 5°

(b) Swing

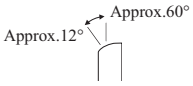
1) Swing flap

Flap moves in upward and downward directions continuously.

◆ In HEAT operation



◆ In COOL, DRY, FAN operation



(c) Memory flap (Flap stopped)

When you press the AIRFLOW button once while the flap is operating, it stops swinging at the position. Since this angle is memorized in the microcomputer, the flap will automatically be set at this angle when the next operation is started.

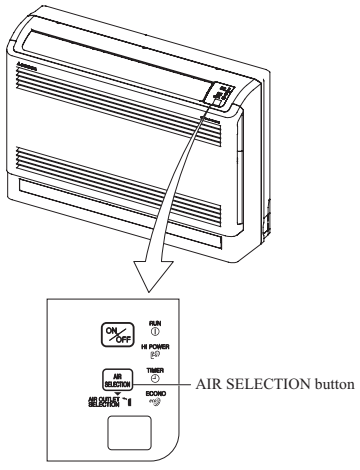
(d) When not operating

The flap returns to the position of air flow directly below, when operation has stopped.

(6) Air outlet selection

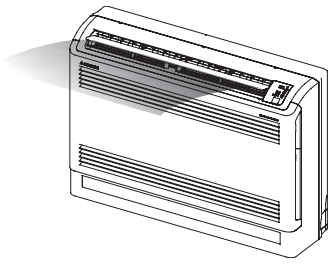
(a) AIR SELECTION button can switch between the combination of upper and lower air outlets and upper air outlet. Not operable while the air conditioner is OFF.

1) Each time the AIR SELECTION button is pressed. The combination of the upper and lower air outlets and the upper air outlet can be switched.
2) When the upper air outlet is selected, AIR OUTLET SELECTION light on the unit display area will light green.



(b) Auto air outlet selection

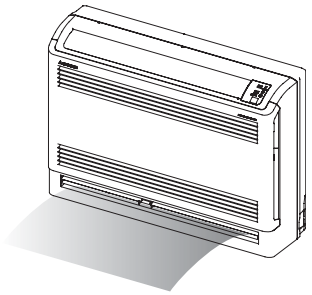
1) COOL, DRY operation



a) In case both lower and upper outlets operation is selected in Cooling or Dry operation, both outlets will be kept for sixty minutes after the start or until indoor temperature is below the setting point. And then the air outlet will change to the upper outlet. That state will be maintained until switch is turned off.

b) In case both outlets operation with Auto fan speed mode is selected, the upper outlet will be kept for ten minutes after the start or until indoor temperature is close to reaching the setting point . And then the air outlet will change to both outlets in order to spread comfort air to every corner.

2) HEAT operation



a) In case both lower and upper outlets operation with Auto fan speed mode is selected, the lower outlet will be kept for twenty minutes after the start or until indoor temperature is close to reaching the setting point . And then the air outlet will change to both outlets. That state will be maintained until the switch is turned off.

b) Automatic adjustment of lower air outlet direction prevents stirring up of warm air and keeps optimum comfort at floor level.

(7) Timer operation

(a) Comfortable timer setting (ON timer)

If the timer is set at ON when the operation select switch is set at the cooling or heating, or the cooling or heating in auto mode operation is selected, the comfortable timer starts and determines the starting time of next operation based on the initial value of 15 minutes and the relationship between the indoor temperature at the setting time (temperature of room temperature sensor) and the setting temperature.

(b) Sleep timer operation

Pressing the SLEEP button causes the temperature to be controlled with respect to the set temperature.

(c) OFF timer operation

The Off timer can be set at a specific time (in 10-minute units) within a 24-hour period.

(8) Outline of heating operation

(a) Operation of major functional components in heating mode

	Heating		
	Thermostat ON	Thermostat OFF	Failure
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON(HOT KEEP)	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF
4-way valve	ON	ON	OFF (3 minutes ON)

(b) Details of control at each operation mode (pattern)

1) Fuzzy operation

Deviation between the indoor temperature setting correction temperature and the return air temperature is calculated in accordance with the fuzzy rule, and used for control of the air capacity and the compressor speed.

Model / Fan speed	SRF25ZJX-S	SRF35ZJX-S	SRF50ZJX-S
Auto	30~102rps	30~115rps	12~110rps
HI	30~102rps	30~115rps	12~110rps
MED	30~76rps	30~106rps	12~80rps
LO	30~58rps	30~80rps	12~60rps

When the defrosting, protection device, etc. is actuated, operation is performed in the corresponding mode.

2) Hot keep operation

If the hot keep operation is selected during the heating operation, the indoor blower is controlled based on the temperature of the indoor heat exchanger (Th2) to prevent blowing of cool wind.

(c) Defrosting operation

1) Starting conditions (Defrosting operation can be started only when all of the following conditions are met.)

a) After start of heating operation
When it elapsed 45 (model 50 : 35) minutes. (Accumulated compressor operation time)

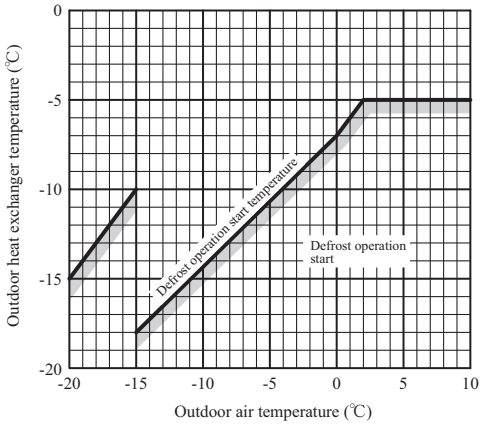
b) After end of defrosting operation
When it elapsed 45 (model 50 : 35) minutes. (Accumulated compressor operation time)

c) Outdoor heat exchanger sensor (TH1) temperature
When the temperature has been below –5ºC for 3 minutes continuously.

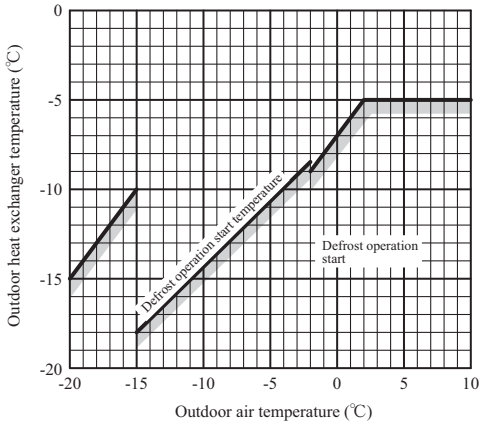
d) The difference between the outdoor air sensor temperature and the outdoor heat exchanger sensor temperature

- The outdoor air temperature ≧ 0°C (model 50 : ≧ -2°C) : 7°C or higher
- -15°C ≦ The outdoor air temperature ＜ 0°C (model 50 : ＜ -2°C) : 4/15 × The outdoor air temperature + 7°C or higher
- The outdoor air temperature < -15°C : -5°C or higher

Models 25,35



Models 50

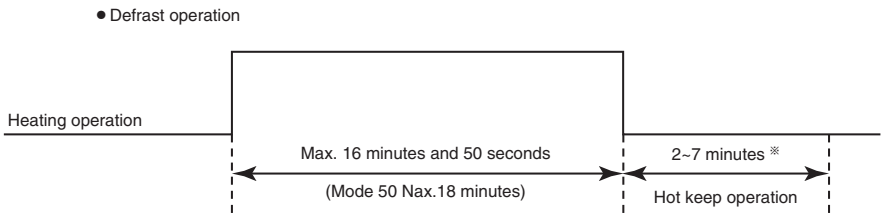


e) During continuous compressor operation
In addition, when the speed command from the indoor controller of the indoor unit during heating operation has counted 0 rps 10 times or more and all conditions of a), b), c) and e) above and the outdoor air temperature is 3°C or less are satisfied (note that when the temperature for outdoor heat exchanger sensor (TH1) is -5°C or less: 62 rps or more, -4°C or less: less than 62 rps), defrost operation is started.

2) Ending conditions (Operation returns to the heating cycle when either one of the following is met.)

a) Outdoor heat exchanger sensor (TH1) temperature: 13ºC (model 50 : 10°C) or higher

b) Continued operation time of defrosting → For more than 16 minutes and 50 seconds (model 50 : 18 minutes).



※Depends on an operation condition, the time can be longer than 7 minutes.

(9) Outline of cooling operation

(a) Operation of major functional components in Cooling mode

	Cooling		
	Thermostat ON	Thermostat OFF	Failure
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF (few minutes ON)
4-way valve	OFF	OFF	OFF

(b) Detail of control in each mode (Pattern)

1) Fuzzy operation

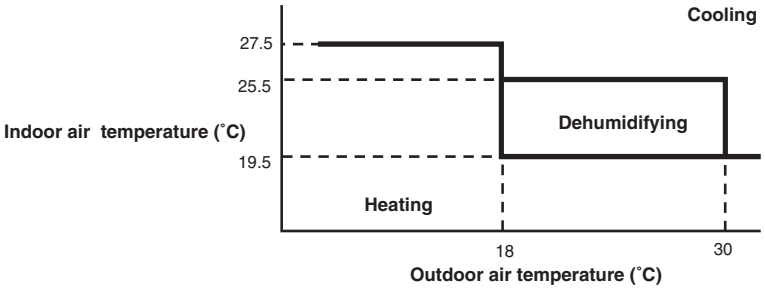
During the fuzzy operation, the air flow and the compressor speed are controlled by calculating the difference between the indoor temperature setting correction temperature and the retum air temperature.

Model / Fan speed	SRF25ZJX-S	SRF35ZJX-S	SRF50ZJX-S
Auto	20~72rps	20~104rps	12~86rps
HI	20~72rps	20~104rps	12~86rps
MED	20~48rps	20~70rps	12~58rps
LO	20~34rps	20~46rps	12~38rps

(10) Outline of automatic operation

(a) Determination of operation mode

The unit checks the indoor air temperature and the outdoor air temperature, determines the operation mode, and then begins in the automatic operation.



(b) The unit checks the temperature every hour after the start of operation and, if the result of check is not same as the previous operation mode, changes the operation mode.

(c) When the unit is started again within one hour after the stop of automatic operation or when the automatic operation is selected during heating, cooling or dehumidifying operation, the unit is operated in the previous operation mode.

(d) Setting temperature can be adjusted within the following range. There is the relationship as shown below between the signals of the wireless remote controller and the setting temperature.

Unit : ºC

		Signals of wireless remote controller (Display)												
		–6	–5	–4	–3	–2	–1	±0	+1	+2	+3	+4	+5	+6
Setting temperature	Cooling	18	19	20	21	22	23	24	25	26	27	28	29	30
	Dehumidifying	19	20	21	22	23	24	25	26	27	28	29	30	31
	Heating	20	21	22	23	24	25	26	27	28	29	30	31	32

(11) Protective control function

(a) Frost prevention control (During cooling or dehumidifying)

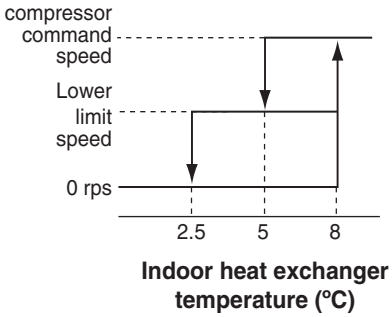
1) Operating conditions

a) Indoor heat exchanger temperature (Th2) is lower than 5ºC.

b) 5 minutes after reaching the compressor command speed except 0 rps.

2) Detail of anti-frost operation

Item \ Indoor heat exchanger temperature	5°C or lower	2.5°C or lower
Lower limit of compressor command speed	22 rps (model 50 : 25 rps)	0 rps
Indoor fan	Depends on operation mode	Protects the fan tap just before frost prevention control
Outdoor fan	Depends on command speed	Depends on stop mode
4-way valve	OFF	



Notes (1) When the indoor heat exchanger temperature is in the range of 2.5~5 ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the temperature is lower than 2.5 ºC, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of 5~8 ºC, the compressor command speed is been maintained.

3) Reset conditions: When either of the following condition is satisfied.

a) The indoor heat exchanger temperature (Th2) is 8ºC or higher.

b) The compressor command speed is 0 rps.

(b) Cooling overload protective control

1) Operating conditions: When the outdoor air temperature (TH2) has become continuously for 30 seconds at 41ºC or more, or 47ºC or more (Model 50: 41ºC or more) with the compressor running, the lower limit speed of compressor is brought up.

Item \ Model	SRF25, 35ZJX-S		SRF50ZJX-S
Outdoor air temperature	41°C or more	47°C or more	41°C or more
Lower limit speed	30 rps	40 rps	30 rps

2) Detail of operation

a) The outdoor fan is stepped up by 3 speed step. (Upper limit 7th (model 50 : 8th) speed.)

b) The lower limit of compressor command speed is set to 30 or 40 (model 50 : 30) rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30 or 40 (model 50 : 30) rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature is lower than 40ºC or 46ºC.

b) The compressor command speed is 0 rps.

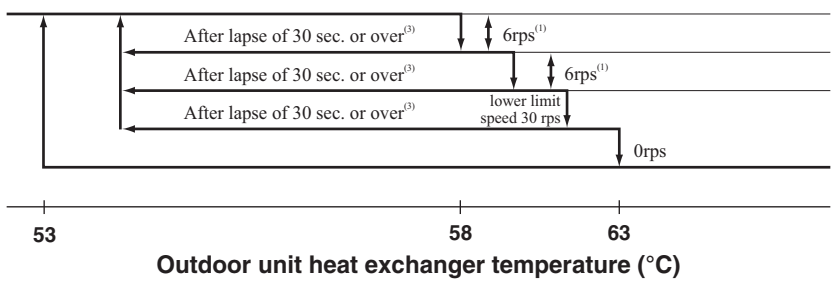
(c) Cooling high pressure control

1) Purpose: Prevents anomalous high pressure operation during cooling.

2) Detector: Outdoor heat exchanger sensor (TH1)

3) Detail of operation:

(Example) Fuzzy



Notes (1) When the outdoor heat exchanger temperature is in the range of 58~63 ºC, the speed is reduced by 6 rps at each 30 seconds.
(2) When the temperature is 63 ºC or higher, the compressor is stopped.
(3) When the outdoor heat exchanger temperature is in the range of 53~58 ºC, if the compressor command speed is been maintained and the operation has continued for more than 30 seconds at the same speed, it returns to the normal cooling operation.

(d) Cooling low outdoor temperature protective control

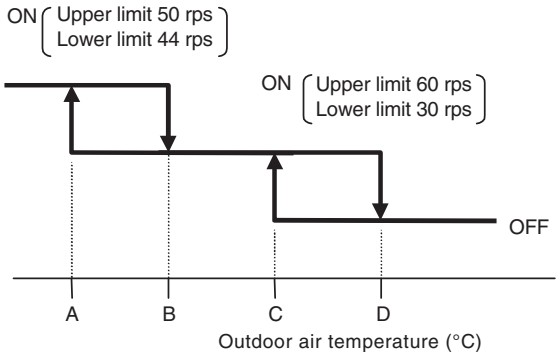
1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 20 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation:

a) The lower limit of the compressor command speed is set to 44 (30) rps and even if the speed becomes lower than 44 (30) rps, the speed is kept to 44 (30) rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

b) The upper limit of the compressor command speed is set to 50 (60) rps and even if the calculated result becomes higher than that after fuzzy calculation, the speed is kept to 50 (60) rps.

Note (1) Values in ( ) are for outdoor air temperature is 22ºC or 25ºC



● Values of A, B, C, D

	Outdoor air temp. (˚C)			
	A	**B**	**C**	**D**
First time	0	3	22	25
Since the seconds times	7	10	25	28

3) Reset conditions: When either of the following condition is satisfied

a) The outdoor air temperature (TH2) is D ˚C or higher.

b) The compressor command speed is 0 rps.

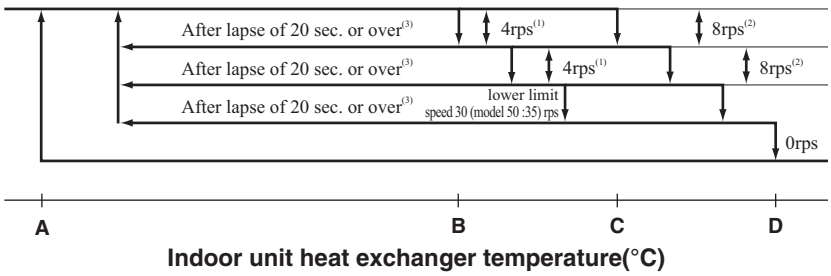
(e) Heating high pressure control

1) Purpose: Prevents anomalous high pressure operation during heating.

2) Detector: Indoor heat exchanger sensor (Th2)

3) Detail of operation:

(Example) Fuzzy



Notes (1) When the indoor heat exchanger temperature is in the range of B~C ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the indoor heat exchanger temperature is in the range of C~D ºC, the speed is reduced by 8 rps at each 20 seconds. When the temperature is D ºC or higher continues for 1 minute, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of A~B ºC, if the compressor command speed is been maintained and the operation has continued for more than 20 seconds at the same speed, it returns to the normal heating operation.
(4) Indoor blower retains the fan tap when it enters in the high pressure control. Outdoor blower is operated in accordance with the speed.

● **Temperature list**

Models 25 , 35 Unit : ºC

	A	**B**	**C**	**D**
RPSmin < 50	48	53	55	58
50 ≦ RPSmin < 95	48.5	56	58	61
95 ≦ RPSmin < 97	48.5	56 ~ 55.5	58	61
97 ≦ RPSmin < 104	48.5	55.5 ~ 51.5	58 ~ 53.5	61
104 ≦ RPSmin < 115	48.5 ~ 42.1	51.5 ~ 44	53.5 ~ 47.3	61
115 ≦ RPSmin	42.1	44	47.3	61

Note (1) RPSmin: The lower one between the outdoor speed and the compressor command speed

Model 50 Unit : ºC

	A	B	C	D
RPSmin < 88	48.5	56	58	61
88 ≦ RPSmin < 108	44	51.5	53.5	56.5
108 ≦ RPSmin	39	46.5	48.5	51.5

Note (1) RPSmin: The lower one between the outdoor speed and the compressor command speed

(f) Heating overload protective control

1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC (model 50 : 17ºC) or higher continues for 30 seconds while the compressor command speed other than 0 rps.

2) Detail of operation:

a) Taking the upper limit of compressor command speed range at 60 rps (model 50 : 50 rps), if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.

b) The lower limit of compressor command speed is set to 40 rps (model 50 : 35 rps) and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 40 rps (model 50 : 35 rps). However, when the thermo becomes OFF, the speed is reduced to 0 prs.

c) Inching prevention control is activated and inching prevention control is carried out with the minimum speed set at 40 rps (model 50 : 35 rps).

d) The outdoor fan is set on 2nd speed.

e) The indoor fan is stepped up by 1 speed step. (Upper limit 8th speed)

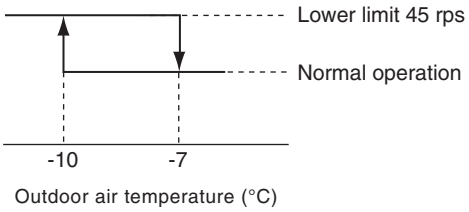
3) Reset conditions: The outdoor air temperature (TH2) is lower than 21ºC (model 50 : 16ºC).

(g) Heating low outdoor temperature protective control

• Models : 20 , 35

1) Operating conditions: When the outdoor air temperature (TH2) is lower than −10ºC or higher continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The lower limit compressor command speed is change as shown in the figure below.



3) Reset conditions: When either of the following condition is satisfied.

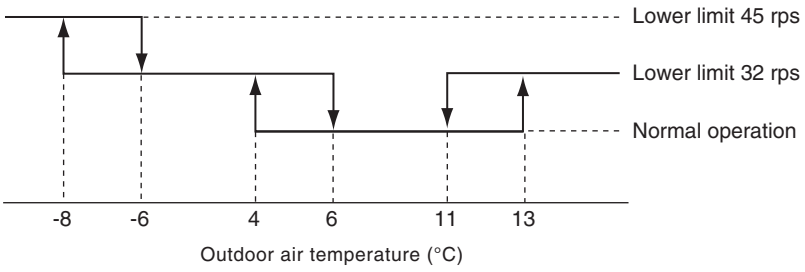
a) The outdoor air temperature (TH2) becomes −7ºC.

b) The compressor command speed is 0 rps.

• Model 50

1) Operating conditions: When the outdoor air temperature (TH2) is lower than 4ºC or 13ºC or higher continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The lower limit compressor command speed is change as shown in the figure below.



3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature (TH2) becomes 6ºC ~ 11ºC.

b) The compressor command speed is 0 rps.

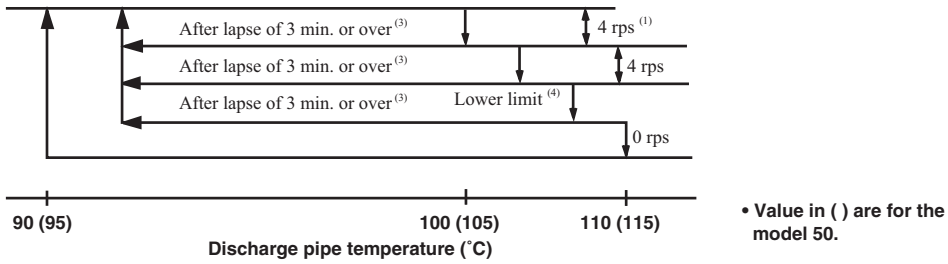
(h) Compressor overheat protection

1) Purpose: It is designed to prevent deterioration of oil, burnout of motor coil and other trouble resulting from the compressor overheat.

2) Detail of operation

a) Speeds are controlled with temperature detected by the sensor mounted on the discharge pipe.

(Example) Fuzzy


After lapse of 3 min. or over (3)
4 rps (1)
After lapse of 3 min. or over (3)
4 rps
After lapse of 3 min. or over (3)
Lower limit (4)
0 rps
90 (95)
100 (105)
110 (115)
Discharge pipe temperature (˚C)
• Value in ( ) are for the model 50.

Notes (1) When the discharge pipe temperature is in the range of 100~110ºC (model 50 : 105~115ºC), the speed is reduced by 4 rps.

(2) When the discharge pipe temperature is raised and continues operation for 20 seconds without changing, then the speed is reduced again by 4 rps.

(3) If the discharge pipe temperature is in the range of 90~100ºC (model 50 : 95~105ºC) even when the compressor command speed is maintained for 3 minutes when the temperature is in the range of 90~100ºC (model 50 : 95~105ºC), the speed is raised by 1 rps and kept at that speed for 3 minutes. This process is repeated until the command speed is reached.

(4) Lower limit speed

Model \ Item		Cooling	Heating
Lower limit speed	25,35	20 rps	30 rps
	50	25 rps	32 rps

b) If the temperature of 110ºC (model 50 : 115ºC) is detected by the sensor on the discharge pipe, then the compressor will stop immediately.

When the discharge pipe temperature drops and the time delay of 3 minutes is over, the unit starts again within 1 hour but there is no start at the third time.

(i) Current safe

1) Purpose: Current is controlled not to exceed the upper limit of the setting operation current.

2) Detail of operation: Input current to the converter is monitored with the current sensor fixed on the printed circuit board of the outdoor unit and, if the operation current value reaches the limiting current value, the compressor command speed is reduced.

If the mechanism is actuated when the compressor command speed is less than 30 rps, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(j) Current cut

1) Purpose: Inverter is protected from overcurrent.

2) Detail of operation: Output current from the inverter is monitored with a shunt resistor and, if the current exceeds the setting value, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(k) Outdoor unit failure

This is a function for determining when there is trouble with the outdoor unit during air conditioning.

The compressor is stopped if any one of the following in item 1), 2) is satisfied. Once the unit is stopped by this function, it is not restarted.

1) When the input current is measured at 1 A or less for 3 continuous minutes or more.

2) If the outdoor unit sends a 0 rps signal to the indoor unit 3 times or more within 20 minutes of the power being turned on.

(l) Indoor fan motor protection

When the air conditioner is operating and the indoor fan motor is turned ON, if the indoor fan motor has operated at 150 rpm or under for more than 30 seconds, the unit enters first in the stop mode and then stops the entire system.

(m) Serial signal transmission error protection

1) Purpose: Prevents malfunction resulting from error on the indoor ↔ outdoor signals.

2) Detail of operation: If the compressor is operating and a serial signal cannot be received from the indoor control with outdoor control having serial signals continues for 7 minute and 35 seconds, the compressor is stopped.After the compressor has been stopped, it will be restarted after the compressor start delay if a serial signal can be received again from the indoor control.

(n) Rotor lock

If the motor for the compressor does not turn after it has been started, it is determined that a compressor lock has occurred and the compressor is stopped.

(o) Outdoor fan motor protection

If the outdoor fan motor has operated at 75 rpm or under for more than 30 seconds, the compressor and fan motor are stopped.

(p) Outdoor fan control at low outdoor temperature

◆ **Cooling**

1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: After the outdoor fan operates at A speed for 60 seconds; the corresponding outdoor heat exchanger temperature shall implement the following controls.

● Value of A

	Outdoor fan
Outdoor temperature > 10˚C	2nd speed
Outdoor temperature ≦ 10˚C	1st speed

a) Outdoor heat exchanger temperature ≦ 21ºC
After the outdoor fan speed drops (down) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is lower than 21ºC, gradually reduce the outdoor fan speed by 1 speed. (Lower limit 1st speed)

b) 21ºC < Outdoor heat exchanger temperature ≦ 38ºC
After the outdoor fan speed maintains at A speed for 20 seconds; if the outdoor heat exchanger temperature is 21ºC~ 38ºC, maintain outdoor fan speed.

c) Outdoor heat exchanger tempeature > 38ºC
After the outdoor fan speed rises (up) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is higher than 38ºC, gradually increase outdoor fan speed by 1 speed. (Upper limit 3rd speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 25ºC or higher.

b) The compressor command speed is 0 rps.

◆ **Heating**

1) Operating conditions: When the outdoor air temperature (TH2) is 4ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The outdoor fan is stepped up by 2 speed step at each 20 seconds. (Upper limit 8th speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 6ºC or higher.

b) The compressor command speed is 0 rps.

(q) Refrigeration cycle system protection

1) Starting conditions

a) When 5 minutes have elapsed after the compressor ON or the completion of the defrost control

b) Other than the defrost control

c) When, after meeting the conditions of a) and b) above, the compressor speed, indoor air temperature (Th1) and indoor heat exchanger temperature (Th2) have met the conditions in the following table for 5 minutes:

Operation mode	Compressor speed (N)	Indoor air temperature (Th1)	Indoor air temperature (Th1)/ Indoor heat exchanger temperature (Th2)
Cooling	50(40)≦N	10≦Th1≦40	Th1−4<Th2
Heating	50(40)≦N	0≦Th1≦40	Th2<Th1+6

Note (1) Value in ( ) are for the model 50.

2) Contents of control

a) When the conditions of 1) above are met, the compressor stops.

b) Error stop occurs when the compressor has stopped 3 times within 60 minutes.

3) Resetting condition

When the compressor has been turned OFF

10.4 Models SRR25,35ZJ-S

(1) Operation control function by remote controller

Operation section

Model All models

FAN SPEED button

Each time the button is pressed, the ■ display is switched over in turn.

HI POWER/ECONO button

This button changes the HIGH POWER/ ECONOMY mode.

TEMPERATURE button

These buttons set the room temperature. (These buttons are used for setting the current time and timer function as well.)

ON TIMER button

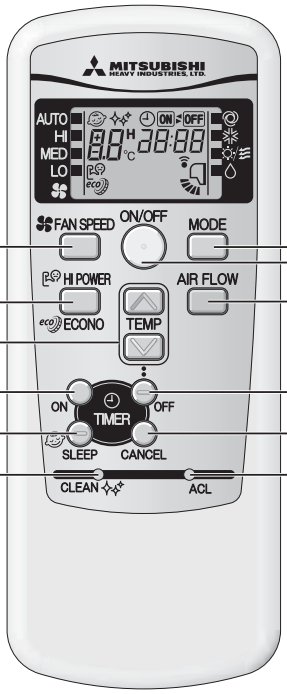
This button selects ON TIMER operation.

SLEEP button

This button selects to SLEEP operation.

CLEAN switch

This switch changes the CLEAN mode.



OPERATION MODE select button

Each time the button pressed, the ■ display is switched over in turn.

ON/OFF (luminous) button

Press to start operation, press again to stop.

AIR FLOW (UP/DOWN) button

This button changes the air flow (up/down) direction.
This button is not used.
(Air flow direction adjustment can not be performed.)

OFF TIMER button

This button selects OFF TIMER operation.

CANCEL button

This button cancels the ON timer, OFF timer, and SLEEP operation.

ACL switch

This switch is for resetting microcomputer and setting time.

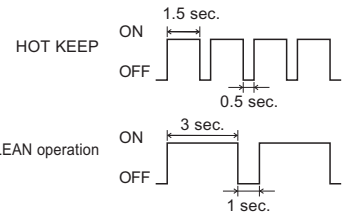
- The above illustration shows all controls, but in practice only the relevant parts are shown.

Unit display section

Model All models

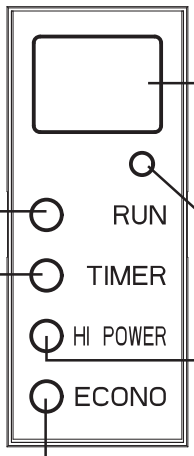
RUN (HOT KEEP) light (green)

- Illuminates during operation.
- Blinks when airflow stops due to the 'HOT KEEP' and 'CLEAN operation'.



TIMER light (yellow)

Illuminates during TIMER operation.



Remote control signal receiver

Unit ON/OFF button

This button can be used for turning on/off the unit when remote control is not available.

HI POWER light (green)

Illuminates during HIGH POWER operation.

ECONO light (orange)

Illuminates during ECONOMY operation.

(2) Unit ON/OFF button

When the remote controller batteries become weak, or if the remote controller is lost or malfunctioning, this button may be used to turn the unit on and off.

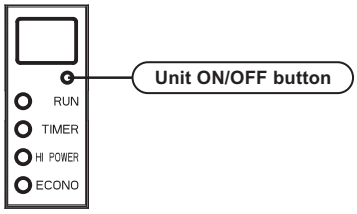
(a) Operation

Push the button once to place the unit in the automatic mode. Push it once more to turn the unit off.

(b) Details of operation

The unit will go into the automatic mode in which it automatically determines, from indoor temperature (as detected by sensor), whether to go into the cooling, thermal dry or heating modes.

Function / operation mode	Indoor temperature setting	Fan speed	Flap/Louver	Timer Switch
Cooling	About 24ºC	Auto	Auto	Continuous
Thermal dry	About 25ºC			
Heating	About 26ºC			



(3) Auto restart function

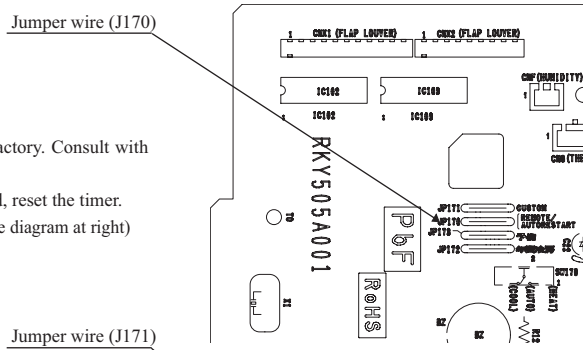
(a) Auto restart function records the operational status of the air-conditioner immediately prior to be switched off by a power cut, and then automatically resumes operations after the power has been restored.

(b) The following settings will be cancelled:

1) Timer settings

2) HIGH POWER operations

Notes (1) Auto restart function is set at on when the air-conditioner is shipped from the factory. Consult with your dealer if this function needs to be switched off.
(2) When power failure ocurrs, the timer setting is cancelled. Once power is resumed, reset the timer.
(3) If the jumper wire (J170) "AUTO RESTART" is cut, auto restart is disabled. (See the diagram at right)



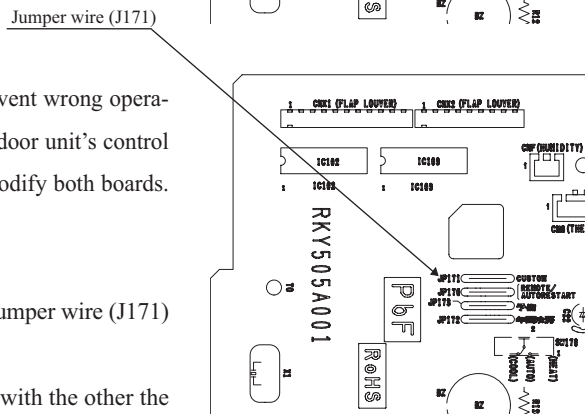
(4) Custom cord switching procedure

If two wireless remote controller are installed in one room, in order to prevent wrong operation due to mixed signals, please modify the printed circuit board in the indoor unit's control box and the remote controller using the following procedure. Be sure to modify both boards. If only one board is modified, receiving (and operation) cannot be done.

(a) Modifying the indoor printed circuit board

Take out the printed circuit board from the control box and cut off jumper wire (J171) using wire cutters.

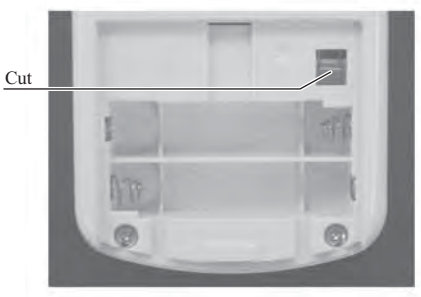
After cutting of the jumper wire, take measures to prevent contact with the other the lead wires, etc.



(b) Modifying the wireless remote controller

1) Remove the battery.

2) Cut the jumper wire shown in the figure at right.



(5) Timer operation

(a) Comfortable timer setting (ON timer)

If the timer is set at ON when the operation select switch is set at the cooling or heating, or the cooling or heating in auto mode operation is selected, the comfortable timer starts and determines the starting time of next operation based on the initial value of 15 minutes and the relationship between the indoor temperature at the setting time (temperature of room temperature sensor) and the setting temperature.

(b) Sleep timer operation

Pressing the SLEEP button causes the temperature to be controlled with respect to the set temperature.

(c) OFF timer operation

The Off timer can be set at a specific time (in 10-minute units) within a 24-hour period.

(6) Outline of heating operation

(a) Operation of major functional components in heating mode

	Heating		
	Thermostat ON	Thermostat OFF	Failure
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON(HOT KEEP)	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF
4-way valve	ON	ON	OFF (3 minutes ON)

(b) Details of control at each operation mode (pattern)

1) Fuzzy operation

Deviation between the indoor temperature setting correction temperature and the return air temperature is calculated in accordance with the fuzzy rule, and used for control of the air capacity and the compressor speed.

Model / Fan speed	SRR25ZJ-S	SRR35ZJ-S
Auto	30~102rps	30~115rps
HI	30~102rps	30~115rps
MED	30~72rps	30~76rps
LO	30~42rps	30~46rps

When the defrosting, protection device, etc. is actuated, operation is performed in the corresponding mode.

2) Hot keep operation

If the hot keep operation is selected during the heating operation, the indoor blower is controlled based on the temperature of the indoor heat exchanger (Th2) to prevent blowing of cool wind.

(c) Defrosting operation

1) Starting conditions (Defrosting operation can be started only when all of the following conditions are met.)

a) After start of heating operation

When it elapsed 45 minutes. (Accumulated compressor operation time)

b) After end of defrosting operation

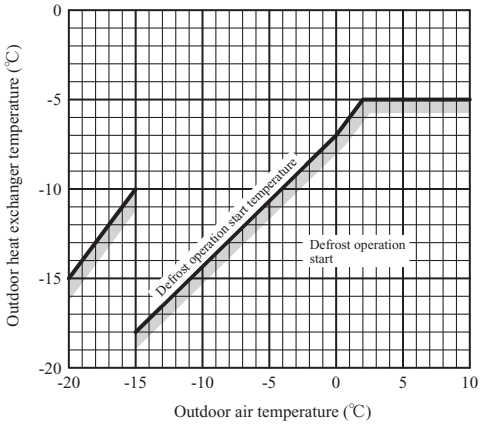
When it elapsed 45 minutes. (Accumulated compressor operation time)

c) Outdoor heat exchanger sensor (TH1) temperature

When the temperature has been below –5ºC for 3 minutes continuously.

d) The difference between the outdoor air sensor temperature and the outdoor heat exchanger sensor temperature

- The outdoor air temperature $\geqq$ 0°C : 7°C or higher
- -15°C $\leqq$ The outdoor air temperature $<$ 0°C : 4/15 × The outdoor air temperature + 7°C or higher
- The outdoor air temperature < -15°C : -5°C or higher

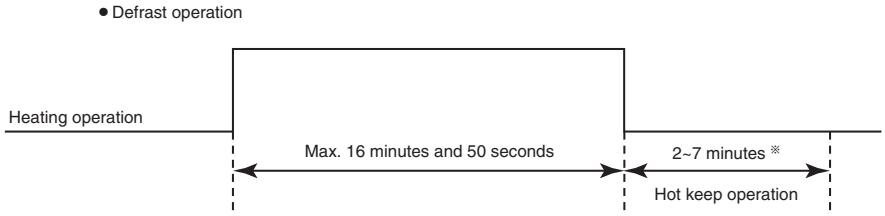


e) During continuous compressor operation
In addition, when the speed command from the indoor controller of the indoor unit during heating operation has counted 0 rps 10 times or more and all conditions of a), b), c) and e) above and the outdoor air temperature is 3°C or less are satisfied (note that when the temperature for outdoor heat exchanger sensor (TH1) is -5°C or less: 62 rps or more, -4°C or less: less than 62 rps), defrost operation is started.

2) Ending conditions (Operation returns to the heating cycle when either one of the following is met.)

a) Outdoor heat exchanger sensor (TH1) temperature: 13ºC or higher

b) Continued operation time of defrosting → For more than 16 minutes and 50 seconds.



※Depends on an operation condition, the time can be longer than 7 minutes.

(7) Outline of cooling operation

(a) Operation of major functional components in Cooling mode

	Cooling		
	Thermostat ON	**Thermostat OFF**	**Failure**
Compressor	ON	OFF	OFF
Indoor fan motor	ON	ON	OFF
Outdoor fan motor	ON	OFF (few minutes ON)	OFF (few minutes ON)
4-way valve	OFF	OFF	OFF

(b) Detail of control in each mode (Pattern)

1) Fuzzy operation

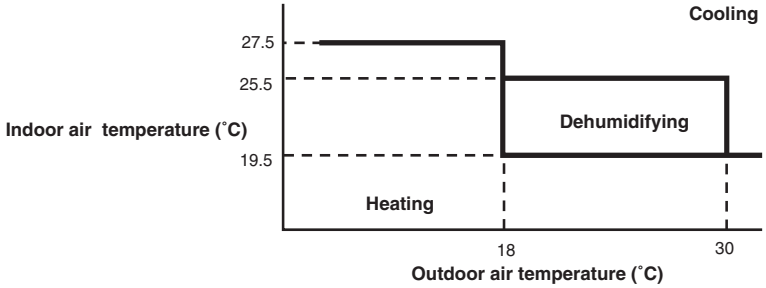
During the fuzzy operation, the air flow and the compressor speed are controlled by calculating the difference between the indoor temperature setting correction temperature and the retum air temperature.

Model / Fan speed	SRR25ZJ-S	SRR35ZJ-S
Auto	20~74rps	20~110rps
HI	20~74rps	20~110rps
MED	20~55rps	20~74rps
LO	20~34rps	20~44rps

(8) Outline of automatic operation

(a) Determination of operation mode

The unit checks the indoor air temperature and the outdoor air temperature, determines the operation mode, and then begins in the automatic operation.



(b) The unit checks the temperature every hour after the start of operation and, if the result of check is not same as the previous operation mode, changes the operation mode.

(c) When the unit is started again within one hour after the stop of automatic operation or when the automatic operation is selected during heating, cooling or dehumidifying operation, the unit is operated in the previous operation mode.

(d) Setting temperature can be adjusted within the following range. There is the relationship as shown below between the signals of the wireless remote controller and the setting temperature.

Unit : ºC

		Signals of wireless remote controller (Display)												
		–6	–5	–4	–3	–2	–1	±0	+1	+2	+3	+4	+5	+6
Setting temperature	Cooling	18	19	20	21	22	23	24	25	26	27	28	29	30
	Dehumidifying	19	20	21	22	23	24	25	26	27	28	29	30	31
	Heating	20	21	22	23	24	25	26	27	28	29	30	31	32

(9) Protective control function

(a) Frost prevention control (During cooling or dehumidifying)

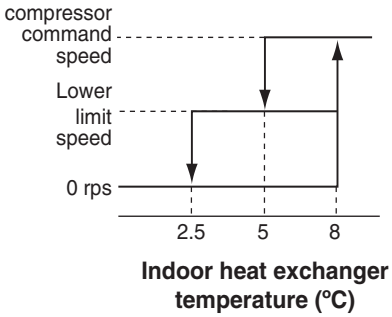
1) Operating conditions

a) Indoor heat exchanger temperature (Th2) is lower than 5ºC.

b) 5 minutes after reaching the compressor command speed except 0 rps.

2) Detail of anti-frost operation

Item \ Indoor heat exchanger temperature	5°C or lower	2.5°C or lower
Lower limit of compressor command speed	22 rps	0 rps
Indoor fan	Depends on operation mode	Protects the fan tap just before frost prevention control
Outdoor fan	Depends on command speed	Depends on stop mode
4-way valve	OFF	



Notes (1) When the indoor heat exchanger temperature is in the range of 2.5~5 ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the temperature is lower than 2.5 ºC, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of 5~8 ºC, the compressor command speed is been maintained.

3) Reset conditions: When either of the following condition is satisfied.

a) The indoor heat exchanger temperature (Th2) is 8ºC or higher.

b) The compressor command speed is 0 rps.

(b) Cooling overload protective control

1) Operating conditions: When the outdoor air temperature (TH2) has become continuously for 30 seconds at 41ºC or more, or 47ºC or more with the compressor running, the lower limit speed of compressor is brought up.

Item \ Model	SRR25, 35ZJ-S	
Outdoor air temperature	41°C or more	47°C or more
Lower limit speed	30 rps	40 rps

2) Detail of operation

a) The outdoor fan is stepped up by 3 speed step. (Upper limit 7th speed.)

b) The lower limit of compressor command speed is set to 30 or 40 rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30 or 40 rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature is lower than 40ºC or 46ºC.

b) The compressor command speed is 0 rps.

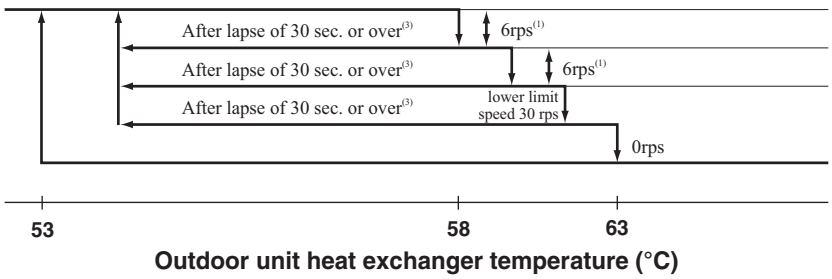
(c) Cooling high pressure control

1) Purpose: Prevents anomalous high pressure operation during cooling.

2) Detector: Outdoor heat exchanger sensor (TH1)

3) Detail of operation:

(Example) Fuzzy



Notes (1) When the outdoor heat exchanger temperature is in the range of 58~63 ºC, the speed is reduced by 6 rps at each 30 seconds.
(2) When the temperature is 63 ºC or higher, the compressor is stopped.
(3) When the outdoor heat exchanger temperature is in the range of 53~58 ºC, if the compressor command speed is been maintained and the operation has continued for more than 30 seconds at the same speed, it returns to the normal cooling operation.

(d) Cooling low outdoor temperature protective control

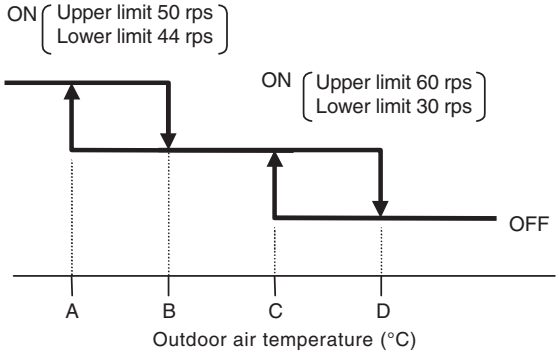
1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 20 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation:

a) The lower limit of the compressor command speed is set to 44 (30) rps and even if the speed becomes lower than 44 (30) rps, the speed is kept to 44 (30) rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

b) The upper limit of the compressor command speed is set to 50 (60) rps and even if the calculated result becomes higher than that after fuzzy calculation, the speed is kept to 50 (60) rps.

Note (1) Values in ( ) are for outdoor air temperature is 22ºC or 25ºC



● Values of A, B, C, D

	Outdoor air temp. (˚C)			
	A	**B**	**C**	**D**
First time	0	3	22	25
Since the seconds times	7	10	25	28

3) Reset conditions: When either of the following condition is satisfied

a) The outdoor air temperature (TH2) is D ˚C or higher.

b) The compressor command speed is 0 rps.

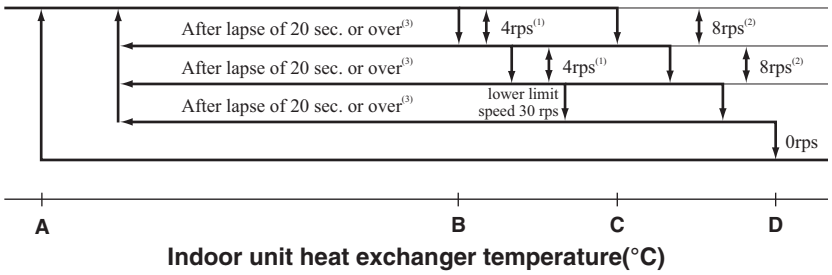
(e) Heating high pressure control

1) Purpose: Prevents anomalous high pressure operation during heating.

2) Detector: Indoor heat exchanger sensor (Th2)

3) Detail of operation:

(Example) Fuzzy



Notes (1) When the indoor heat exchanger temperature is in the range of B~C ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the indoor heat exchanger temperature is in the range of C~D ºC, the speed is reduced by 8 rps at each 20 seconds. When the temperature is D ºC or higher continues for 1 minute, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of A~B ºC, if the compressor command speed is been maintained and the operation has continued for more than 20 seconds at the same speed, it returns to the normal heating operation.
(4) Indoor blower retains the fan tap when it enters in the high pressure control. Outdoor blower is operated in accordance with the speed.

- **Temperature list**

Unit : ºC

	A	B	C	D
RPSmin < 50	48	53	55	58
50 ≦ RPSmin < 95	48.5	56	58	61
95 ≦ RPSmin < 97	48.5	56 ~ 55.5	58	61
97 ≦ RPSmin < 104	48.5	55.5 ~ 51.5	58 ~ 53.5	61
104 ≦ RPSmin < 115	48.5 ~ 42.1	51.5 ~ 44	53.5 ~ 47.3	61
115 ≦ RPSmin	42.1	44	47.3	61

Note (1) RPSmin: The lower one between the outdoor speed and the compressor command speed

(f) Heating overload protective control

1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or higher continues for 30 seconds while the compressor command speed other than 0 rps.

2) Detail of operation:

a) Taking the upper limit of compressor command speed range at 60 rps, if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.

b) The lower limit of compressor command speed is set to 40 rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 40 rps. However, when the thermo becomes OFF, the speed is reduced to 0 prs.

c) Inching prevention control is activated and inching prevention control is carried out with the minimum speed set at 40 rps.

d) The outdoor fan is set on 2nd speed.

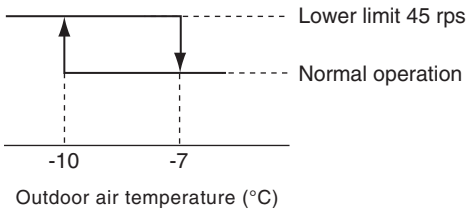
e) The indoor fan is stepped up by 1 speed step. (Upper limit 8th speed)

3) Reset conditions: The outdoor air temperature (TH2) is lower than 21ºC.

(g) Heating low outdoor temperature protective control

1) Operating conditions: When the outdoor air temperature (TH2) is lower than −10ºC or higher continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The lower limit compressor command speed is change as shown in the figure below.



3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature (TH2) becomes −7ºC.

b) The compressor command speed is 0 rps.

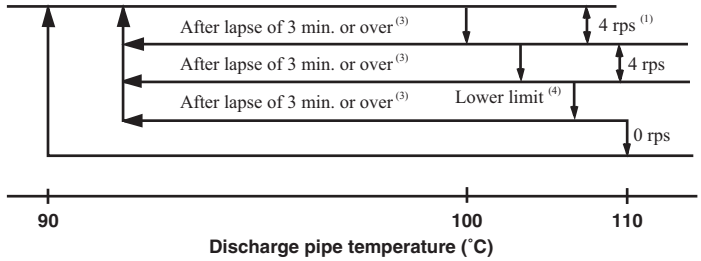
(h) Compressor overheat protection

1) Purpose: It is designed to prevent deterioration of oil, burnout of motor coil and other trouble resulting from the compressor overheat.

2) Detail of operation

a) Speeds are controlled with temperature detected by the sensor mounted on the discharge pipe.

(Example) Fuzzy



Notes (1) When the discharge pipe temperature is in the range of 100~110ºC, the speed is reduced by 4 rps.

(2) When the discharge pipe temperature is raised and continues operation for 20 seconds without changing, then the speed is reduced again by 4 rps.

(3) If the discharge pipe temperature is in the range of 90~100ºC even when the compressor command speed is maintained for 3 minutes when the temperature is in the range of 90~100ºC, the speed is raised by 1 rps and kept at that speed for 3 minutes. This process is repeated until the command speed is reached.

(4) Lower limit speed

Item / Model	Cooling	Heating
Lower limit speed	20 rps	30 rps

b) If the temperature of 110ºC is detected by the sensor on the discharge pipe, then the compressor will stop immediately. When the discharge pipe temperature drops and the time delay of 3 minutes is over, the unit starts again within 1 hour but there is no start at the third time.

(i) Current safe

1) Purpose: Current is controlled not to exceed the upper limit of the setting operation current.

2) Detail of operation: Input current to the converter is monitored with the current sensor fixed on the printed circuit board of the outdoor unit and, if the operation current value reaches the limiting current value, the compressor command speed is reduced.

If the mechanism is actuated when the compressor command speed is less than 30 rps, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(j) Current cut

1) Purpose: Inverter is protected from overcurrent.

2) Detail of operation: Output current from the inverter is monitored with a shunt resistor and, if the current exceeds the setting value, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(k) Outdoor unit failure

This is a function for determining when there is trouble with the outdoor unit during air conditioning.
The compressor is stopped if any one of the following in item 1), 2) is satisfied. Once the unit is stopped by this function, it is not restarted.

1) When the input current is measured at 1 A or less for 3 continuous minutes or more.
2) If the outdoor unit sends a 0 rps signal to the indoor unit 3 times or more within 20 minutes of the power being turned on.

(l) Indoor fan motor protection

When the air conditioner is operating and the indoor fan motor is turned ON, if the indoor fan motor has operated at 300 rpm or under for more than 30 seconds, the unit enters first in the stop mode and then stops the entire system.

(m) Serial signal transmission error protection

1) Purpose: Prevents malfunction resulting from error on the indoor ↔ outdoor signals.

2) Detail of operation: If the compressor is operating and a serial signal cannot be received from the indoor control with outdoor control having serial signals continues for 7 minute and 35 seconds, the compressor is stopped.After the compressor has been stopped, it will be restarted after the compressor start delay if a serial signal can be received again from the indoor control.

(n) Rotor lock

If the motor for the compressor does not turn after it has been started, it is determined that a compressor lock has occurred and the compressor is stopped.

(o) Outdoor fan motor protection

If the outdoor fan motor has operated at 75 rpm or under for more than 30 seconds, the compressor and fan motor are stopped.

(p) Outdoor fan control at low outdoor temperature

◆ **Cooling**

1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: After the outdoor fan operates at A speed for 60 seconds; the corresponding outdoor heat exchanger temperature shall implement the following controls.

● Value of A

	Outdoor fan
Outdoor temperature > 10˚C	2nd speed
Outdoor temperature ≦ 10˚C	1st speed

a) Outdoor heat exchanger temperature ≦ 21ºC
After the outdoor fan speed drops (down) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is lower than 21ºC, gradually reduce the outdoor fan speed by 1 speed. (Lower limit 1st speed)

b) 21ºC < Outdoor heat exchanger temperature ≦ 38ºC
After the outdoor fan speed maintains at A speed for 20 seconds; if the outdoor heat exchanger temperature is 21ºC~ 38ºC, maintain outdoor fan speed.

c) Outdoor heat exchanger tempeature > 38ºC
After the outdoor fan speed rises (up) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is higher than 38ºC, gradually increase outdoor fan speed by 1 speed. (Upper limit 3rd speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 25ºC or higher.
b) The compressor command speed is 0 rps.

◆ **Heating**

1) Operating conditions: When the outdoor air temperature (TH2) is 4ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The outdoor fan is stepped up by 2 speed step at each 20 seconds. (Upper limit 8th speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 6ºC or higher.

b) The compressor command speed is 0 rps.

(q) Drain motor (DM) control

1) Drain motor (DM) is operated during the cooling or dehumidifying mode operations and simultaneously wity the compressor ON. The DM continues to operate for 5 minutes after the operation stop, anomalous stop, thermostat stop or when it was switched from the cooling and dehumidifying operations to the fan or heating operation.

	Indoor unit operation mode				
	Stop (1)	Cooling	Dehumidifying	Fan (2)	Heating
Compressor ON		Control A			
Compressor OFF	Control B				

Note (1) Inciuding the stop from the cooling, dehumiditying, fan and heating, and the anomalous stop
(2) Inciuding the "Fan" operation according to the mismatch of operation modes

a) Control A

i) If the float switch detects any anomalous draining condition, the unit stops with the anomalous stop and the drain pump starts. After detecting the anomalous condition, the drain motor comtinues to be ON.

ii) It keeps operating while the float switch is detecting the anomalous condition.

b) Control B

If the float switch detects any anomalous drain condition, the drain motor is turned ON for 5 minutes, and at 10 seconds after the drain motor OFF it checks the float switch. If it is normal, the unit is stopped under the normal mode or, if there is any anomalous condition, displayed by the flashing of display lights and the drain motor is turned ON. (The ON condition is maintained during the drain detection.)

(r) Refrigeration cycle system protection

1) Starting conditions

a) When 5 minutes have elapsed after the compressor ON or the completion of the defrost control

b) Other than the defrost control

c) When, after meeting the conditions of a) and b) above, the compressor speed, indoor air temperature (Th1) and indoor heat exchanger temperature (Th2) have met the conditions in the following table for 5 minutes:

Operation mode	Compressor speed (N)	Indoor air temperature (Th1)	Indoor air temperature (Th1)/ Indoor heat exchanger temperature (Th2)
Cooling	50≦N	10≦Th1≦40	Th1−4<Th2
Heating	50≦N	0≦Th1≦40	Th2<Th1+6

2) Contents of control

a) When the conditions of 1) above are met, the compressor stops.

b) Error stop occurs when the compressor has stopped 3 times within 60 minutes.

3) Resetting condition

When the compressor has been turned OFF

10.5 Models FDTC25,35VD

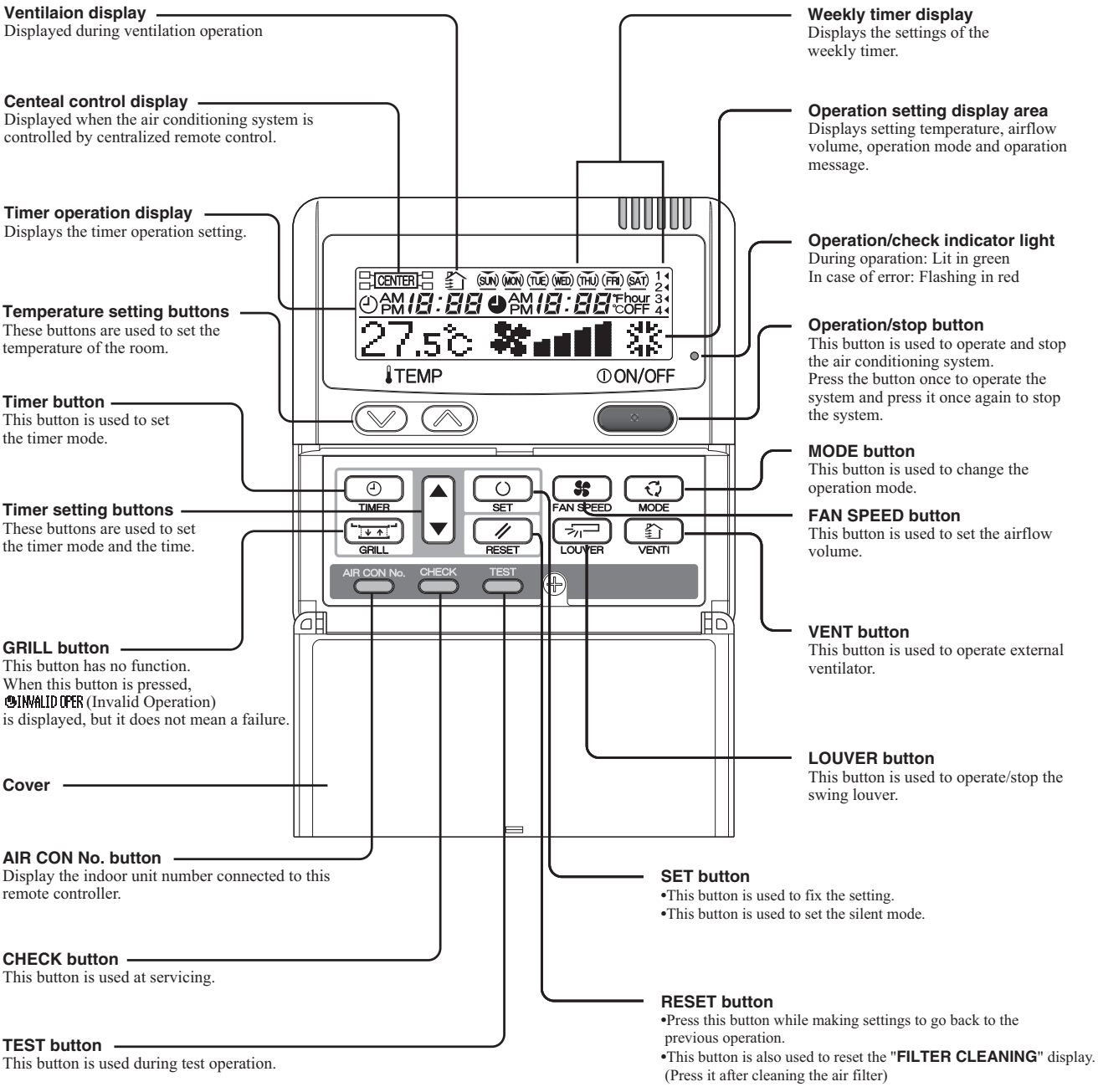
(1) Remote controller (Option parts)

(a) Wired remote controller

The figure below shows the remote controller with the cover opened. Note that all the items that may be displayed in the liquid crystal display area are shown in the figure for the sake of explanation

Characters displayed with dots in the liquid crystal display area are abbreviated.

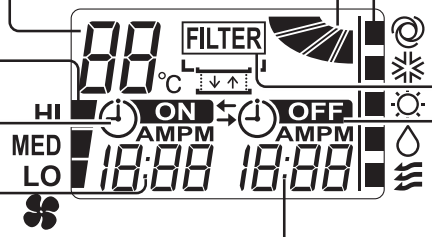
The figure below shows the remote control with the cover opened.


Ventilaion display
Displayed during ventilation operation
Centeal control display
Displayed when the air conditioning system is controlled by centralized remote control.
Timer operation display
Displays the timer operation setting.
Temperature setting buttons
These buttons are used to set the temperature of the room.
Timer button
This button is used to set the timer mode.
Timer setting buttons
These buttons are used to set the timer mode and the time.
GRILL button
This button has no function.
When this button is pressed,
INVALID OPER (Invalid Operation)
is displayed, but it does not mean a failure.
Cover
AIR CON No. button
Display the indoor unit number connected to this remote controller.
CHECK button
This button is used at servicing.
TEST button
This button is used during test operation.
Weekly timer display
Displays the settings of the weekly timer.
Operation setting display area
Displays setting temperature, airflow volume, operation mode and oparation message.
Operation/check indicator light
During oparation: Lit in green
In case of error: Flashing in red
Operation/stop button
This button is used to operate and stop the air conditioning system.
Press the button once to operate the system and press it once again to stop the system.
MODE button
This button is used to change the operation mode.
FAN SPEED button
This button is used to set the airflow volume.
VENT button
This button is used to operate external ventilator.
LOUVER button
This button is used to operate/stop the swing louver.
SET button
•This button is used to fix the setting.
•This button is used to set the silent mode.
RESET button
•Press this button while making settings to go back to the previous operation.
•This button is also used to reset the "FILTER CLEANING" display. (Press it after cleaning the air filter)
CENTER
SUN MON TUE WED THU FRI SAT
AM PM 18:88
27.5℃
TEMP
ON/OFF
TIMER
SET
FAN SPEED
MODE
GRILL
RESET
LOUVER
VENTI
AIR CON No.
CHECK
TEST

∗ All displays are described in the liguid crystal display for explanation.

(b) Wireless remote controller

Indication section



ROOM TEMP display
Indicates set temperature.

FAN SPEED display
Indicates the selected airflow volume

ON-TIMER display
Indicates when ON-TIMER is set.

ON TIMER setting time display
Indicates the ON-TIMER setting time. Nothing displayed when ON-TIMER is not set.

AIR FLOW display
Indicates the status of swing louver.

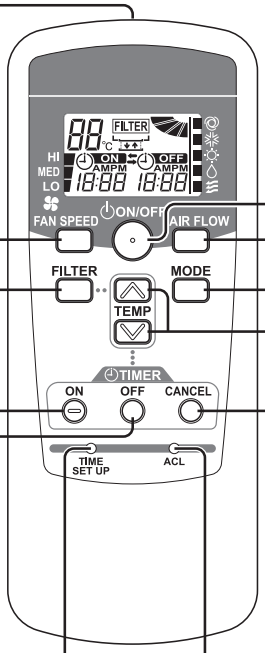
OPERATION MODE display
Indicates selected operation with ■.

FILTER display
Indicates for two seconds when FILTER button is pressed.

OFF-TIMER display
Indicates when OFF-TIMER is set.

OFF-TIMER setting time display
Indicates OFF-TIMER setting time. Indicates the current time when the OFF-TIMER is not set.

Operation section



Transmitter
Sends signal to the air conditioner.

FAN SPEED button
Every time this button is pressed, the mode is switched as below.

→HI→MED→LO

FILTER button
Used to reset (turn off) the filter sign. Press the button only after completing the filter cleaning.

ON TIMER button
Sets ON TIMER operation.

OFF TIMER button
Sets OFF TIMER operation.

TIME SET UP switch
Sets current time.

ON/OFF button
When this is pressed once, the unit starts to operate and when this is pressed once again, it stops operating.

AIR FLOW button
Used to swing the louver.

OPERATION MODE select button
Every time this button is pressed, ■ displays switch as below.

→ (AUTO) → (COOL) → (HEAT) → (DRY) → (FAN) →

ROOM TEMP/TIME SETTING button
Sets room temperature by pressing ∧ or ∨ button. Sets time when setting the time.

TIMER CANCEL button
Used to cancel the TIMER SETTINGS.

RESET switch
Used to reset the microcomputer.

* All displays are described in the liquid crystal display for explanation

(2) Operation control function by the wired remote controller

(a) Switching sequence of the operation mode switches of remote controller

(b) [CPU reset]

This functions when “CHECK” and “GRILL” buttons on the remote controller are pressed simultaneously. Operation is same as that of the power supply reset.

(c) [Power failure compensation function]...Electric power supply failure

- This becomes effective if “Power failure compensation effective” is selected with the setting of remote controller function.
- Since it memorizes always the condition of remote controller, it starts operation according to the contents of memory no sooner than normal state is recovered after the power failure. Although the auto swing stop position and the timer mode are cancelled, the weekly timer setting is restored with the holiday setting for all weekdays.
  After recovering from the power failure, it readjusts the clock and resets the holiday setting for each weekday so that the setting of weekly timer becomes effective.
- Content memorized with the power failure compensation are as follows.

Note (1) Items⑥, ⑦ and ⑧ are memorized regardless whether the power failure compensation is effective or not while the setting of silent mode is cancelled regardless whether the power failure compensation is effective or not.

① At power failure – Operating/stopped
If it had been operating under the off timer mode, sleep timer mode, the state of stop is memorized. (Although the timer mode is cancelled at the recovery from power failure, the setting of weekly timer is changed to the holiday setting for all weekdays.)

② Operation mode

③ Airflow volume mode

④ Room temperature setting

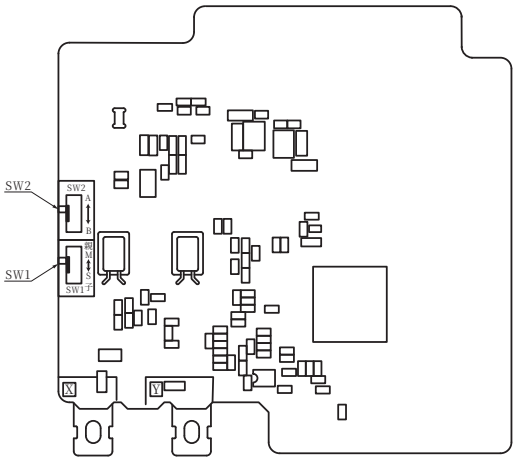
⑤ Louver auto swing/stop
However, the stop position (4-position) is cancelled so that it returns to Position (1).

⑥ “Remote controller function items” which have been set with the remote controller function setting (“Indoor function items” are saved in the memory of indoor unit.)

⑦ Upper limit value and lower limit value which have been set with the temperature setting control

⑧ Sleep timer and weekly timer settings (Other timer settings are not memorized.)

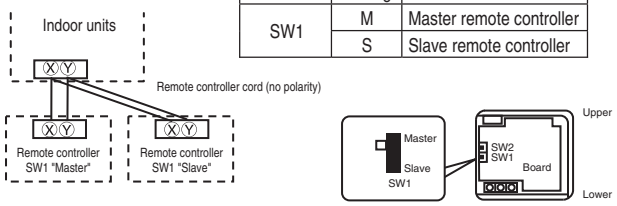
[Parts layout on remote controller PCB]



Master/ slave setting when more than one remote controllers are used

A maximum of two remote controllers can be connected to one indoor unit (or one group of indoor units.)

Switch	Setting	Contents
SW1	M	Master remote controller
	S	Slave remote controller



Set SW1 to “Stave” for the slave remote controller. It was factory set to “Master” for shipment.

Note: The setting “Remote controller thermistor enabled” is only selectable with the master remote controller in the position where you want to check room temperature.
The air conditioner operation follows the last operation of the remote controller regardless of the master / slave setting of it.

Caution

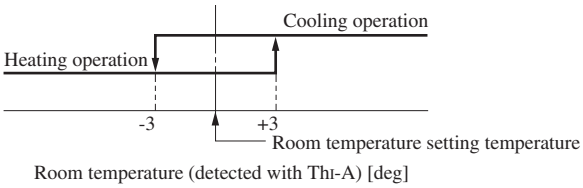
When using multiple remote controllers, the following dispiays or settings cannot be done with the slave remote controller. It is available only with the master remote controller.

①Louver position setting (set upper or lower limit of swinging range)
②Setting indoor unit functions
③Setting temperature range
④Operation data display
⑤Error data display
⑥Silent mode setting
⑦Test operation of drain pump
⑧Remote controller sensor setting

(3) Operation control function by the indoor controller

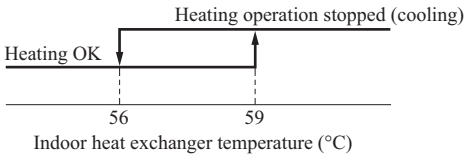
(a) Auto operation

If "Auto" mode is selected by the remote controller, the heating and the cooling are automatically switched according to the difference between outdoor air temperature and setting temperature and the difference between setting temperature and return air temperature. (When the switching of cooling mode ↔ heating mode takes place within 3 minutes, the compressor does not operate for 3 minutes by the control of 3-minute timer.) This will facilitate the cooling/heating switching operation in intermediate seasons and the adaptation to unmanned operation at stores, etc.



Note (1) Room temperature control during auto cooling/auto heating is performed according to the room temperature setting temperature. (DIFF: ±1 deg)

(2) If the indoor heat exchanger temperature rises to 59°C or higher during heating operation, it is switched automatically to cooling operation. In addition, for 1 hour after this switching, the heating operation is not performed, regardless of the temperature shown at right.



(b) Operations of functional items during cooling/heating

Operation / Functional item	Cooling		Fan	Heating			Dehumidify
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Hot start (Defrost)	
Compressor	○	×	×	○	×	○	○/×
4-way valve	×	×	×	○	○	○(×)	×
Outdoor unit fan	○	×	×	○	×	○(×)	○/×
Indoor unit fan	○	○	○	○/×	○/×	○/×	○/×
Louver motor	○/×			○/×	○/×	○/×	○/×
Drain pump (3)	○	×(2)	×(2)	○/×(2)			Thermostat ON: ○ Thermostat OFF: ×(2)

Note (1) ○: Operation ×: Stop ○/×: Turned ON/OFF by the control other than the room temperature control.
(2) ON during the drain motor delay control.
(3) Drain pump ON setting may be selected with the indoor unit function setting of the wired remote controller.

(c) Dehumidifying operation

1) When the humidity sensor is not provided

Return air temperature thermistor [Thı-A (by the remote controller when the remote controller thermistor is enabled)] controls the indoor temperature environment simultaneously.

a) Operation is started in the cooling mode. When the difference between the return air temperature and the setting temperature is 2°C or less, the indoor unit fan tap is brought down by one tap. That tap is retained for 3 minutes after changing the indoor unit fan tap.

b) If the return air temperature exceeds the setting temperature by 3°C during defrosting operation, the indoor unit fan tap is raised. That tap is retained for 3 minutes after changing the indoor unit fan tap.

c) If the thermostat OFF is established during the above control, the indoor unit fan tap at the thermostat ON is retained so far as the thermostat is turned OFF.

d) After stopping the cooling operation, the indoor unit continues to run at Lo for 15 seconds.

2) When the humidity thermistor is provided [Optional]

a) Operation starts in the cooling mode, and the target relative temperature is determined based on the setting temperature. If the humidity detected by the humidity thermistor becomes lower than the target relative temperature, the indoor unit fan tap is retained.

b) Anything other than a) above is same as the item 1) above.

(d) Timer operation

1) Sleep timer

Set the duration of time from the present to the time to turn off the air-conditioner.

It can be selected from 10 steps in the range from "OFF 1 hour later" to "OFF 10 hours later". After the sleep timer setting, the remaining time is displayed with progress of time in the unit of hour.

2) OFF timer

Time to turn OFF the air-conditioner can be set in the unit of 10 minutes.

3) ON timer

Time to turn ON the air-conditioner can be set. Indoor temperature can be set simultaneously.

4) Weekly timer

Timer operation (ON timer, OFF timer) can be set up to 4 times a day for each weekday.

5) Timer operations which can be set in combination

Item / Item	Sleep timer	OFF timer	ON timer	Weekly timer
Sleep timer		×	○	×
OFF timer	×		○	×
ON timer	○	○		×
Weekly timer	×	×	×	

Note (1) ○: Allowed ×: Not

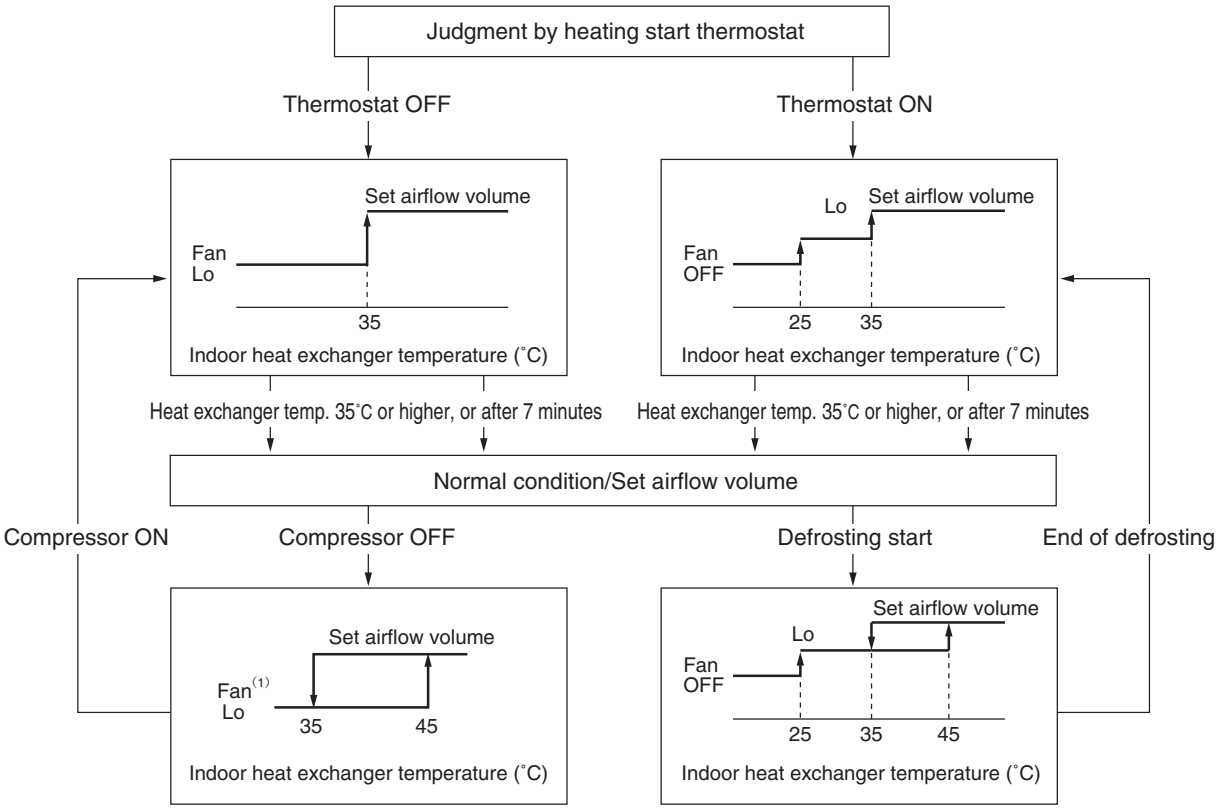
(e) Remote controller display during the operation stop

1) "Centralized control ON" is displayed always on the LCD under the "Center/Remote" and "Center" modes during the operation stop (Power ON). This is not displayed under the "Remote" mode.

2) If this display is not shown under the "Center/Remote" mode, check if the indoor unit power switch is turned on or not.

(f) Hot start (Cold draft prevention at heating)

At the startup of heating operation, at resetting of the thermostat, during defrost operation and at returning to heating, the indoor fan is controlled by the indoor heat exchanger temperature (detected with Thı-R) for preventing the cold draft.



Note (1) Heating preparation is displayed during the hot start (when the compressor is operating and the indoor fan does not provide the set airflow volume).

(g) Hot keep

Hot keep control is performed at the start of the defrost control.

1) Control
   a) When the indoor heat exchanger temperature (detected with Thı-R1 or R2) drops to 35°C or lower, the speed of indoor fan is changed to the lower tap at each setting.
   b) During the hot keep, the louver horizontal control signal is transmitted.
2) Ending condition
   When the indoor fan is at the lower tap at each setting, it returns to the set airflow volume as the indoor heat exchanger temperature rises to 45°C or higher.

(h) Fan control during the heating thermostat OFF

When the heating thermostat is turned OFF, the setting of the fan control is selectable using the indoor function of wired remote controller [☼ FAN CONTROL].

1) Low fan speed (Factory default)
   If the indoor heat exchanger temperature drops below 35°C with the heating thermostat OFF, the indoor fan operate at the lower speed tap at each setting.
2) Set fan speed
   Even if the indoor heat exchanger temperature drops below 35°C with the heating thermostat OFF, the indoor fan continues to run at the set airflow volume.
3) Intermittence
   If the indoor heat exchanger temperature drops below 35°C with the heating thermostat OFF, the indoor fan operates at the lower speed tap at each setting and, when the indoor heater exchanger temperature drops below 25°C, the indoor fan stops for 5 minutes. Then the fan runs at the low speed tap for 2 minutes, and the judgment is made by the thermostat.
4) Fan OFF
   If the indoor heat exchanger temperature drops below 35°C with the heating thermostat OFF, the indoor fan is turned OFF. The same applies also when the remote controller sensor is effective.

(i) Filter sign

As the operation time (Total ON time of ON/OFF switch) accumulates to 180 hours (1), "FILTER CLEANING" is displayed on the remote controller. (This is displayed when the unit is in trouble and under the centralized control, regardless of ON/OFF)

Note (1) Time setting for the filter sign can be made as shown below using the indoor function of wired remote controller "FILTER SIGN SET". (It is set at 1 at the shipping from factory.)

Filter sign setting	Function
TYPE 1	Setting time: 180 hrs (Factory default)
TYPE 2	Setting time: 600 hrs
TYPE 3	Setting time: 1,000 hrs
TYPE 4	Setting time: 1,000 hrs (Unit stop) (2)

(2) After the setting time has elapsed, the "FILTER CLEANING" is displayed and, after operating for 24 hours further (counted also during the stop), the unit stops.

(j) Auto swing control

1) Louver control
   a) Press the "LOUVER" button to operate the swing louver when the air conditioner is operating.
   "SWING ⇆" is displayed for 3 seconds and then the swing louver moves up and down continuously.
   b) To fix the swing louver at a position, press one time the "LOUVER" button while the swing louver is moving so that four stop positions are displayed one after another per second.
   When a desired stop position is displayed, press the "LOUVER" button again. The display stops, changes to show the "STOP 1 ⌐" for 5 seconds and then the swing louver stops.
   c) Louver operation at the power on with a unit having the louver 4-position control function
   The louver swings one time automatically (without operating the remote controller) at the power on.
   This allows inputting the louver motor (LM) position, which is necessary for the microcomputer to recognize the louver position.

   Note (1) If you press the "LOUVER" button, the swing motion is displayed on the louver position LCD for 10 second. The display changes to the "SWING ⇆" display 3 seconds later.

2) Automatic louver level setting during heating

At the hot start with the heating thermostat OFF, regardless whether the auto swing switch is operated or not (auto swing or louver stop), the louver takes the level position (In order to prevent the cold start). The louver position display LCD continues to show the display which has been shown before entering this control.

3) Louver-free stop control

When the louver-free stop has been selected with the indoor function of wired remote controller "⇄ POSITION", the louver motor stops when it receives the stop signal from the remote controller. If the auto swing signal is received from the remote controller, the auto swing will start from the position where it was before the stop.

Note (1) When the indoor function of wired remote controller "⇄ POSITION" has been switched, switch also the remote control function "⇄ POSITION" in the same way.

4) Individual flap (louver) control system

Regarding FDTC series, the individual flaps (louvers) for 4 directions can be controlled to swing within the ranges between upper limit and lower limit selected with wired remote controller respectively.

For detail setting method, refer to ⑦ in page 89.

Note (1) This function is not able to be set with wireless remote controller or simple remote controller (RCH-E3)

(k) Compressor inching prevention control

1) 3-minute timer

When the compressor has been stopped by the thermostat, remote controller operation switch or anomalous condition, its restart will be inhibited for 3 minutes. However, the 3-minute timer is invalidated at the power on the electric power source for the unit.

2) 3-minute forced operation timer

- Compressor will not stop for 3 minutes after the compressor ON. However, it stops immediately when the unit is stopped by means of the ON/OFF switch or by when the thermister turned OFF the change of operation mode.
- If the thermostat is turned OFF during the forced operation control of heating compressor, the louver position (with the auto swing) is returned to the level position.

Note (1) The compressor stops when it has entered the protective control.

(l) Drain motor

1) Drain motor (DM) is operated during the cooling or dehumidifying mode operations and simultaneously with the compressor ON. The DM continues to operate for 5 minutes after the operation stop, anomalous stop, thermostat stop or when it was switched from the cooling and dehumidifying operations to the fan or heating operation.

	Indoor unit operation mode				
	Stop (1)	Cooling	Dehumidifying	Fan (2)	Heating
Compressor ON		Control A			
Compressor OFF	Control B				

Note (1) Including the stop from the cooling, dehumidifying, fan and heating, and the anomalous stop
(2) Including the "Fan" operation according to the mismatch of operation modes

a) Control A

i) If the float switch detects any anomalous draining condition, the unit stops with the anomalous stop (displays E9) and the drain pump starts. After detecting the anomalous condition, the drain motor continues to be ON.

ii) It keeps operating while the float switch is detecting the anomalous condition.

b) Control B

If the float switch detects any anomalous drain condition, the drain motor is turned ON for 5 minutes, and at 10 seconds after the drain motor OFF it checks the float switch. If it is normal, the unit is stopped under the normal mode or, if there is any anomalous condition, E9 is displayed and the drain motor is turned ON. (The ON condition is maintained during the drain detection.)

2) Drain motor (DM) interlock control

a) Start conditions

Depending on the function setting by the remote controller, the drain motor is turned ON under either one of the following conditions.

i) During heating mode operation (Both the thermostat ON/OFF)

ii) During heating mode operation (Both the thermostat ON/OFF) + Fan operation

iii) Fan operation

b) End conditions

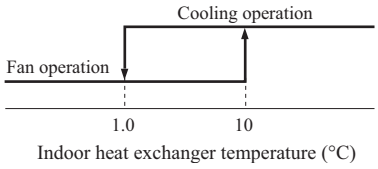
The drain motor is turned OFF 5 minutes after the stop of operations i) to iii) above.

(m) Operation check/drain pump test run operation mode

1) If the power is turned on by the dip switch (SW7-1) on the indoor PCB when electric power source is supplied, it enters the mode of operation check/drain pump test run. It is ineffective (prohibited) to change the switch after turning power on.
2) When the communication with the remote controller has been established within 60 seconds after turning power on by the dip switch (SW7-1) ON, it enters the operation check mode. Unless the remote controller communication is established, it enters the drain pump test run mode.
   Note (1) To select the drain pump test run mode, disconnect the remote controller connector (CNB) on the indoor PCB to shut down the remote controller communication.
3) Operation check mode
   There is no communication with the outdoor unit but it allows performing operation in respective modes by operating the remote controller.
4) Drain pump test run mode
   As the drain pump test run is established, the drain pump only operates and during the operation protective functions by the microcomputer of indoor unit become ineffective.

(n) Cooling, dehumidifying frost protection

1) To prevent frosting during cooling mode or dehumidifying mode operation, the of compressor speed is reduced if the indoor heat exchanger temperature (detected with Thı-R) drops to 1.0 °C or lower at 4 minutes after the start of compressor operation. If the indoor unit heat exchanger temperature is 1.0 °C or lower after 20 seconds, the compressor speed is reduced further. If it becomes 2.5 °C or higher, the control terminates. When the indoor heat exchanger temperature has become as show below after reducing the compressor speed, it is switched to the fan operation. For the selection of indoor fan speed, refer to item 2).



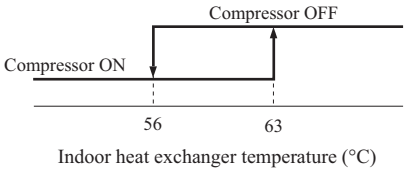
2) Selection of indoor fan speed
   If it enters the frost prevention control during cooling operation (excluding dehumidifying), the indoor unit fan speed is switched.
   a) When the indoor return air detection temperature (detected with Thı-A) is 23°C or higher and the indoor heat exchanger temperature (detected with Thı-R) detects the compressor frequency drop start temperature A°C+1°C, of indoor unit fan speed is increased by 20rpm.
   b) If the phenomenon of i) above is detected again after the acceleration of indoor unit fan, indoor unit fan speed is increased further by 20rpm.
      Note (1) Indoor unit fan speed can be increased by up to 2 taps.
      • Compressor frequency drop start temperature

Item \ Symbol	A
Temperature - Low (Factory default)	1.0
Temperature - High	2.5

Note (1) Frost prevention temperature setting can be selected with the indoor unit function setting of the wired remote controller.

(o) Heating overload protection

1) If the indoor heat exchanger temperature (detected with Thı-R) at 63°C or higher is detected for 2 seconds continuously, the compressor stops. When the compressor is restarted after a 3-minute delay, if a temperature at 63°C or higher is detected for 2 seconds continuously within 60 minutes after initial detection and if this is detected 5 times consecutively, the compressor stops with the anomalous stop (E8). Anomalous stop occurs also when the indoor heat exchanger temperature at 63°C or higher is detected for 6 minutes continuously.



2) Indoor unit fan speed selection
   If, after second detection of heating overload protection up to fourth, the indoor fan is set at Me and Lo taps when the compressor is turned ON, the indoor fan speed is increased by 1 tap.

(p) Anomalous fan motor

After starting the fan motor, if the fan motor speed is 200rpm or less is detected for 30 seconds continuously and 4 times within 60 minutes, then fan motor stops with the anomalous stop (E16).

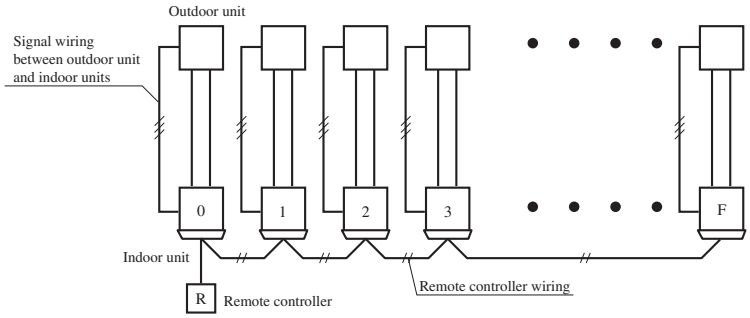
(q) Plural unit control – Control of 16 units group by one remote controller

1) Function

One remote controller switch can control a group of multiple number of unit (Max. 16 indoor units). "Operation mode" which is set by the remote controller switch can operate or stop all units in the group one after another in the order of unit No.(1). Thermostat and protective function of each unit function independently.

Note (1) Unit No. is set by SW2 on the indoor unit control PCB. Unit No. setting by SW2 is necessary for the indoor unit only.

SW2: For setting of 0 – 9, A – F



(2) Unit No. may be set at random unless duplicated, it should be better to set orderly like 0, 1, 2…, F to avoid mistake.

2) Display to the remote controller

a) Center or each remote controller basis, heating preparation: the youngest unit No. among the operating units in the remote mode (or the center mode unless the remote mode is available) is displayed.

b) Inspection display, filter sign: Any of unit that starts initially is displayed.

c) Confirmation of connected units

Pressing "AIR CON No." button on the remote controller displays the indoor unit address. If "▲" "▼" button is pressed at the next, it is displayed orderly starting from the unit of youngest No.

d) In case of anomaly

i) If any anomaly occurs on a unit in a group (a protective function operates), that unit stops with the anomalous stop but any other normal units continue to run as they are.

ii) Signal wiring procedure

Signal wiring between indoor and outdoor units should be made on each unit same as the normal wiring. For the group control, lay connect with sires wiring between rooms using terminal blocks (X, Y) of remote controller.

Connect the remote controller communication wire separately from the power supply wire or wires of other electric devices (AC220V or higher).

(r) High ceiling control

In the case of indoor unit installed in a higher ceiling room, the airflow volume mode control can be changed with the wired remote controller indoor unit function "FAN SPEED SET".

Fan tap		Indoor unit airflow setting			
		- - - -	- - -	- -	- -
FAN SPEED SET	STANDARD	UH - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me
	HIGH SPEED1, 2	UH - UH - Hi - Me	UH - Hi - Me	UH - Me	UH - Hi

Notes (1) Factory default is Standard.

(2) At the hot-start and heating thermostat OFF, or other, the indoor unit fan is operated at the low speed tap of each setting.

(3) This function is not able to be set with wireless remote controller or simple remote controller (RCH-E3)

(s) Abnormal temperature thermistor (return air/indoor heat exchanger) wire/short-circuit detection

1) Broken wire detection

When the return air temperature thermistor detects -50°C or lower or the heat exchanger temperature thermistor detect -50°C or lower for 5 seconds continuously, the compressor stops. After a 3-minute delay, the compressor restarts but, if it is detected again within 60 minutes after the initial detection for 6 minutes continuously, stops again (the return air temperature thermistor: E7, the heat exchanger temperature thermistor: E6).

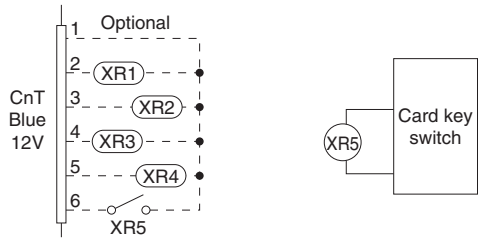
2) Short-circuit detection

If the heat exchanger temperature thermistor detects 70°C or higher for 5 seconds continuously at 2 minutes and 20 seconds after the compressor ON during cooling operation, the compressor stops (E6).

(t) Operation permission/prohibition

(In case of adopting card key switches or commercially available timers)

When the indoor function setting of wired remote controller for "Operation permission/prohibition" is changed from "Invalid (Factory default)" to " Valid", following control becomes effective.



	Normal operation (Factory default)		Operation permission/prohibition mode "Valid" (Local setting)	
CnT-6	ON	OFF	ON	OFF
	Operation	Stop	Operation permission*1	Operation prohibition (Unit stops)

*1 **Only the "LEVEL INPUT" is acceptable for external input**, however when the indoor function setting of "Level input (Factory default)" or "Pulse input" is selected by the function for "External input" of the wired remote controller, operation status will be changed as follows.

In case of "Level input" setting	In case of "Pulse input" setting
Unit operation from the wired remote controller becomes available*(1)	Unit starts operation *(2)

*(1) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Level input (Factory default)";

① When card key switch is ON (CnT-6 ON: Operation permission), start/stop operation of the unit from the wired remote controller becomes available.

② When card key switch is OFF (CnT-6 OFF: Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote controller becomes not available.

*(2) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Pulse input (Local setting)";

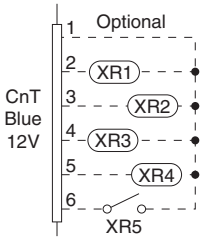
① When card key switch is ON (Operation permission), the unit starts operation in conjunction with ON signal. and also start/stop operation of the unit from the wired remote controller becomes available.

② When card key switch is OFF (Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote controller becomes not available.

(3) This function is invalid only at "Center mode" setting done by central controller.

(u) External input/output control (CnT)

Be sure to connect the wired remote controller to the indoor unit. Without wired remote controller remote operation by CnT is not possible to perform.



①Operation output	(CnT-2: XR1)
②Heating output	(CnT-3: XR2)
③Thermostat ON output	(CnT-4: XR3)
④Error output	(CnT-5: XR4)
⑤Remote operation input	(CnT-6: No-voltage contactor)

1) Output for external control (remote display)

Following output connectors (CnT) are provided on the indoor control PCB for monitoring operation status.

① **Operation output:** Outputs DC12V signal for driving relay during operation

② **Heating output:** Outputs DC12V signal for driving relay during heating operation

③ **Thermostat ON output:** Outputs DC12V signal for driving relay when compressor is operating.

④ **Error output:** Outputs DC12V signal for driving relay when anomalous condition occurs.

2) Remote operation input

Remote operation input connector (CnT-6) is provided on the indoor control PCB.

However remote operation by CnT-6 is not effective, when "Center mode" is selected by center controller.

In case of plural unit (twin, triple, double twin), remote operation input to CnT-6 on the slave indoor unit is invalid.

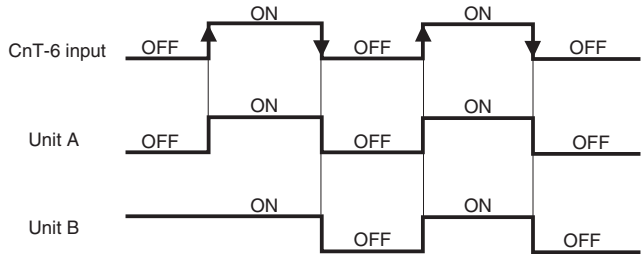
Only the "LEVEL INPUT" is acceptable for external input, however when the indoor function setting of "Level input (Factory default)" or "Pulse input" is selected by the function for "External input" of the wired remote controller, operation status will be changed as follows.

a) In case of "Level input" setting (Factory default)

Input signal to CnT-6 is OFF→ON …… unit ON

Input signal to CnT-6 is ON→OFF …… unit OFF

Operation is not inverted.

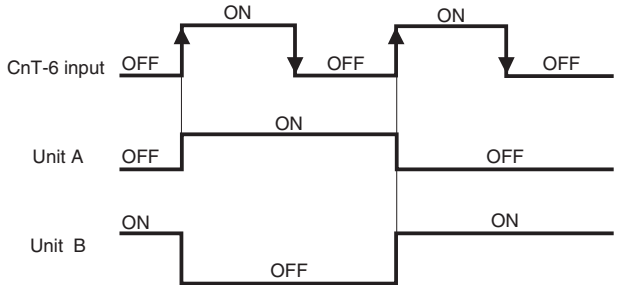


Note: The latest operation has priority

It is available to operate/stop by remote controller or center controller

b) In case of "Pulse input" setting (Local setting)

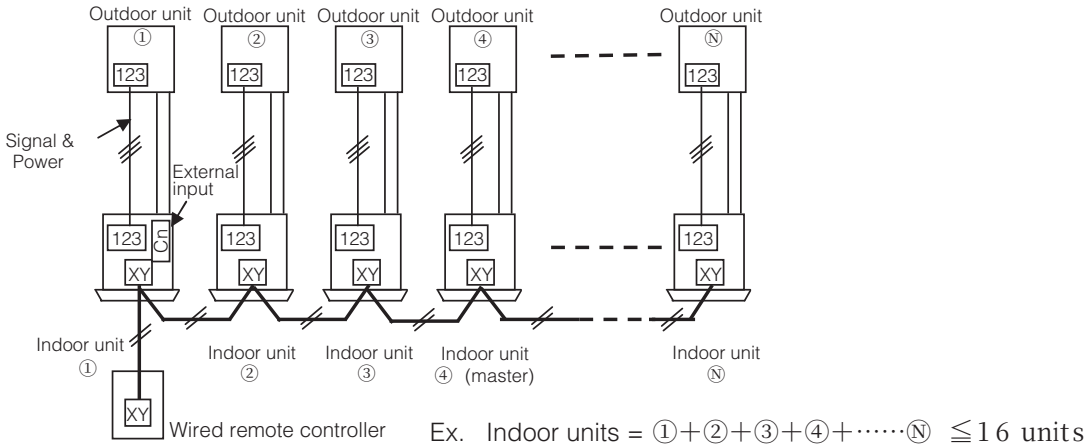
It is effective only when the input signal to CnT-6 is changed OFF→ON, and at that time unit operation [ON/OFF] is inverted.



3) Remote operation

a) In case of multiple units (Max. 16 indoor units group) are connected to one wired remote controller

When the indoor function setting of wired remote controller for "External control set" is changed from "Individual (Factory default)" to " For all units", all units connected in one wired remote controller system can be controlled by external operation input.



	Individual operation (Factory default)		All units operation (Local setting)	
CnT-6	ON	OFF	ON	OFF
	Only the unit directly connected to the remote controller can be operated.	Only the unit directly connected to the remote controller can be stopped opeartion.	All units in one remote controller system can be operated.	All units in one remote controller system can be stopped operation.
	Unit ① only	Unit ① only	Units ①—Ⓝ	Units ①—Ⓝ

When more than one indoor unit (Max. 16 indoor units) are connected in one wired remote controller system:

(1) With the factory default, external input to CnT-6 is effective for only the unit ①.

(2) When setting "For all unit" (Local setting), all units in one remote controller system can be controlled by external input to CnT-6 on the indoor unit ①.

(3) External input to CnT-6 on the other indoor unit than the unit ① is not effective.

(v) Fan control at heating startup

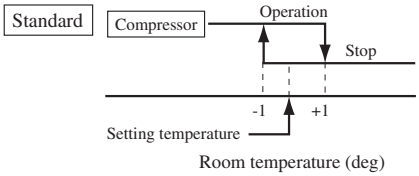
1) Start conditions
At the start of heating operation, if the difference of setting temperature and return air temperature is 5°C or higher after the end of hot start control, this control is performed.

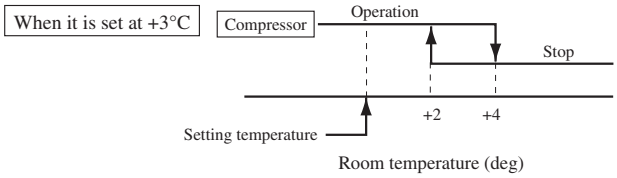
2) Contents of control
a) Sampling is made at each minute and, when the indoor unit heat exchanger temperature (detected with Thı-R) is 37°C or higher, present number of revolutions of indoor unit fan speed is increased by $10min^{-1}$.
b) If the indoor unit heat exchanger temperature drops below 37°C at next sampling, present number of revolutions of indoor unit fan speed is reduced by $10min^{-1}$.

3) End conditions
Indoor fan speed is reduced to the setting airflow volume when the compressor OFF is established and at 30 minutes after the start of heating operation.

(w) Room temperature detection temperature compensation during heating

With the standard specification, the compressor is turned ON/OFF with the thermostat setting temperature. When the thermostat is likely to turn OFF earlier because the unit is installed at the ceiling where warm air tends to accumulate, the setting can be changed with the wired remote controller indoor unit function "☼ SP OFFSET". The compressor and the heater are turned ON/OFF at one of the setting temperature +3, +2 or +1°C in order to improve the feeling of heating. The setting temperature, however, has the upper limit of 30°C.





(x) Return air temperature compensation

This is the function to compensate the deviation between the detection temperature by the return air temperature thermistor and the measured temperature after installing the unit.

1) It is adjustable in the unit of 0.5°C with the wired remote controller indoor unit function "RETURN AIR TEMP".
• +1.0°C, +1.5°C, +2.0°C • -1.0°C, -1.5°C, -2.0°C

2) Compensated temperature is transmitted to the remote controller and the compressor to control them.

Note (1) The detection temperature compensation is effective on the indoor unit thermistor only.

(4) Operation control function by the outdoor controller

(a) Defrosting operation

1) Starting conditions (Defrosting operation can be started only when all of the following conditions are met.)

a) After start of heating operation

When it elapsed 45 minutes. (Accumulated compressor operation time)

b) After end of defrosting operation

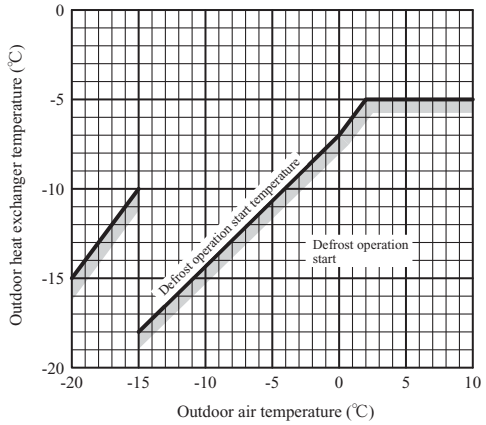
When it elapsed 45 minutes. (Accumulated compressor operation time)

c) Outdoor heat exchanger sensor (TH1) temperature

When the temperature has been below –5ºC for 3 minutes continuously.

d) The difference between the outdoor air sensor temperature and the outdoor heat exchanger sensor temperature

- The outdoor air temperature ≧ 0°C : 7°C or higher
- -15°C ≦ The outdoor air temperature ＜ 0°C : 4/15 × The outdoor air temperature + 7°C or higher
- The outdoor air temperature < -15°C : -5°C or higher



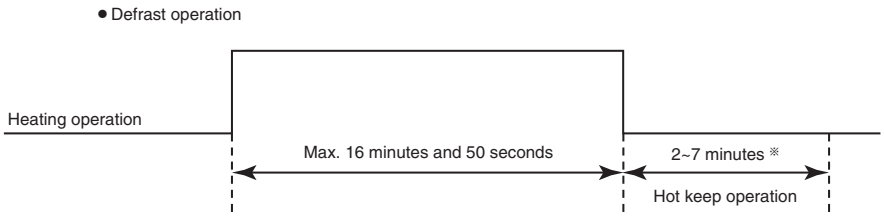
e) During continuous compressor operation

In addition, when the speed command from the indoor controller of the indoor unit during heating operation has counted 0 rps 10 times or more and all conditions of a), b), c) and e) above and the outdoor air temperature is 3°C or less are satisfied (note that when the temperature for outdoor heat exchanger sensor (TH1) is -5°C or less: 62 rps or more, -4°C or less: less than 62 rps), defrost operation is started.

2) Ending conditions (Operation returns to the heating cycle when either one of the following is met.)

a) Outdoor heat exchanger sensor (TH1) temperature: 13ºC or higher

b) Continued operation time of defrosting → For more than 16 minutes and 50 seconds.



※Depends on an operation condition, the time can be longer than 7 minutes.

(b) Cooling overload protective control

1) Operating conditions: When the outdoor air temperature (TH2) has become continuously for 30 seconds at 41ºC or more, or 47ºC or more with the compressor running, the lower limit speed of compressor is brought up.

Item \ Model	FDTC25, 35VD	
Outdoor air temperature	41°C or more	47°C or more
Lower limit speed	30 rps	40 rps

2) Detail of operation

a) The outdoor fan is stepped up by 3 speed step. (Upper limit 7th speed.)

b) The lower limit of compressor command speed is set to 30 or 40 rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 30 or 40 rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature is lower than 40ºC or 46ºC.

b) The compressor command speed is 0 rps.

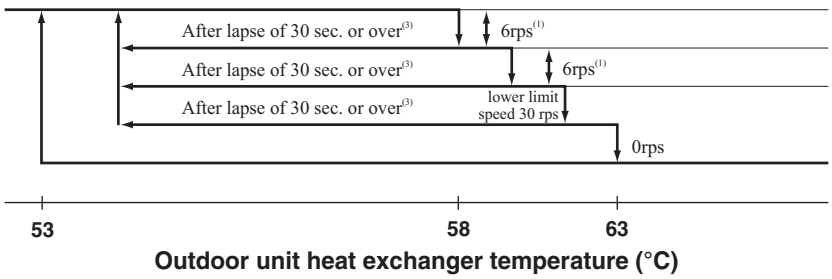
(c) Cooling high pressure control

1) Purpose: Prevents anomalous high pressure operation during cooling.

2) Detector: Outdoor heat exchanger sensor (TH1)

3) Detail of operation:

(Example) Fuzzy



Notes (1) When the outdoor heat exchanger temperature is in the range of 58~63 ºC, the speed is reduced by 6 rps at each 30 seconds.
(2) When the temperature is 63 ºC or higher, the compressor is stopped.
(3) When the outdoor heat exchanger temperature is in the range of 53~58 ºC, if the compressor command speed is been maintained and the operation has continued for more than 30 seconds at the same speed, it returns to the normal cooling operation.

(d) Cooling low outdoor temperature protective control

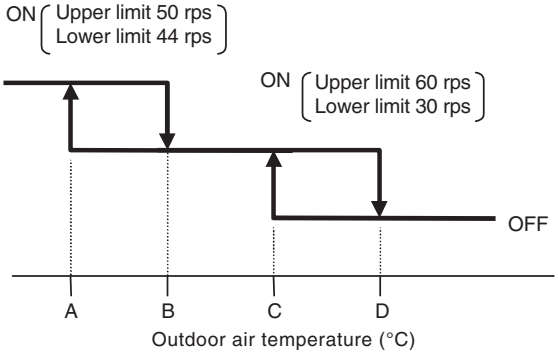
1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 20 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation:

a) The lower limit of the compressor command speed is set to 44 (30) rps and even if the speed becomes lower than 44 (30) rps, the speed is kept to 44 (30) rps. However, when the thermo becomes OFF, the speed is reduced to 0 rps.

b) The upper limit of the compressor command speed is set to 50 (60) rps and even if the calculated result becomes higher than that after fuzzy calculation, the speed is kept to 50 (60) rps.

Note (1) Values in ( ) are for outdoor air temperature is 22ºC or 25ºC



● Values of A, B, C, D

	Outdoor air temp. (˚C)			
	A	**B**	**C**	**D**
First time	0	3	22	25
Since the seconds times	7	10	25	28

3) Reset conditions: When either of the following condition is satisfied

a) The outdoor air temperature (TH2) is D ˚C or higher.

b) The compressor command speed is 0 rps.

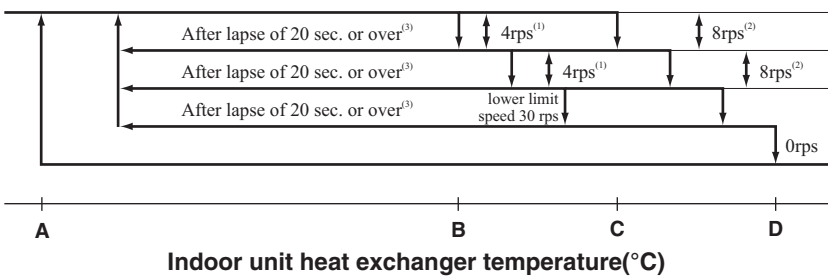
(e) Heating high pressure control

1) Purpose: Prevents anomalous high pressure operation during heating.

2) Detector: Indoor heat exchanger sensor (THI-R)

3) Detail of operation:

(Example) Fuzzy



Notes (1) When the indoor heat exchanger temperature is in the range of B~C ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the indoor heat exchanger temperature is in the range of C~D ºC, the speed is reduced by 8 rps at each 20 seconds. When the temperature is D ºC or higher continues for 1 minute, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of A~B ºC, if the compressor command speed is been maintained and the operation has continued for more than 20 seconds at the same speed, it returns to the normal heating operation.
(4) Indoor blower retains the fan tap when it enters in the high pressure control. Outdoor blower is operated in accordance with the speed.

- **Temperature list**

Unit : ºC

	A	B	C	D
RPSmin < 50	48	53	55	58
50 ≦ RPSmin < 95	48.5	56	58	61
95 ≦ RPSmin < 97	48.5	56 ~ 55.5	58	61
97 ≦ RPSmin < 104	48.5	55.5 ~ 51.5	58 ~ 53.5	61
104 ≦ RPSmin < 115	48.5 ~ 42.1	51.5 ~ 44	53.5 ~ 47.3	61
115 ≦ RPSmin	42.1	44	47.3	61

Note (1) RPSmin: The lower one between the outdoor speed and the compressor command speed

(f) Heating overload protective control

1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or higher continues for 30 seconds while the compressor command speed other than 0 rps.

2) Detail of operation:

a) Taking the upper limit of compressor command speed range at 60 rps, if the output speed obtained with the fuzzy calculation exceeds the upper limit, the upper limit value is maintained.

b) The lower limit of compressor command speed is set to 40 rps and even if the calculated result becomes lower than that after fuzzy calculation, the speed is kept to 40 rps. However, when the thermo becomes OFF, the speed is reduced to 0 prs.

c) Inching prevention control is activated and inching prevention control is carried out with the minimum speed set at 40 rps.

d) The outdoor fan is set on 2nd speed.

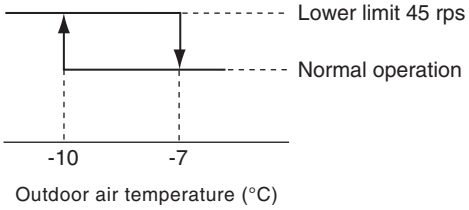
e) The indoor fan is stepped up by 1 speed step.

3) Reset conditions: The outdoor air temperature (TH2) is lower than 21ºC.

(g) Heating low outdoor temperature protective control

1) Operating conditions: When the outdoor air temperature (TH2) is lower than −10ºC or higher continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The lower limit compressor command speed is change as shown in the figure below.



3) Reset conditions: When either of the following condition is satisfied.

a) The outdoor air temperature (TH2) becomes −7ºC.

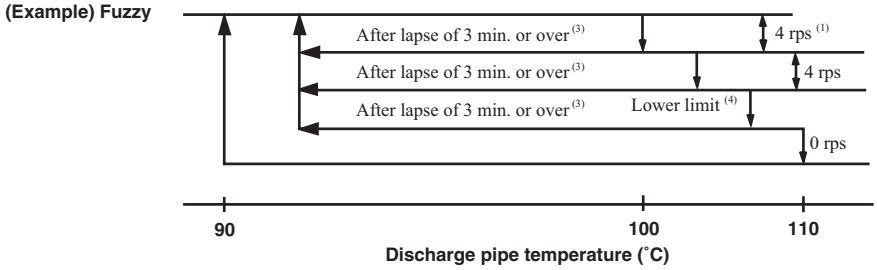
b) The compressor command speed is 0 rps.

(h) Compressor overheat protection

1) Purpose: It is designed to prevent deterioration of oil, burnout of motor coil and other trouble resulting from the compressor overheat.

2) Detail of operation

a) Speeds are controlled with temperature detected by the sensor mounted on the discharge pipe.



Notes (1) When the discharge pipe temperature is in the range of 100~110ºC, the speed is reduced by 4 rps.

(2) When the discharge pipe temperature is raised and continues operation for 20 seconds without changing, then the speed is reduced again by 4 rps.

(3) If the discharge pipe temperature is in the range of 90~100ºC even when the compressor command speed is maintained for 3 minutes when the temperature is in the range of 90~100ºC, the speed is raised by 1 rps and kept at that speed for 3 minutes. This process is repeated until the command speed is reached.

(4) Lower limit speed

Item / Model	Cooling	Heating
Lower limit speed	20 rps	30 rps

b) If the temperature of 110ºC is detected by the sensor on the discharge pipe, then the compressor will stop immediately. When the discharge pipe temperature drops and the time delay of 3 minutes is over, the unit starts again within 1 hour but there is no start at the third time.

(i) Current safe

1) Purpose: Current is controlled not to exceed the upper limit of the setting operation current.

2) Detail of operation: Input current to the converter is monitored with the current sensor fixed on the printed circuit board of the outdoor unit and, if the operation current value reaches the limiting current value, the compressor command speed is reduced.

If the mechanism is actuated when the compressor command speed is less than 30 rps, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(j) Current cut

1) Purpose: Inverter is protected from overcurrent.

2) Detail of operation: Output current from the inverter is monitored with a shunt resistor and, if the current exceeds the setting value, the compressor is stopped immediately. Operation starts again after a delay time of 3 minutes.

(k) Outdoor unit failure

This is a function for determining when there is trouble with the outdoor unit during air conditioning.
The compressor is stopped if any one of the following in item 1), 2) is satisfied. Once the unit is stopped by this function, it is not restarted.

1) When the input current is measured at 1 A or less for 3 continuous minutes or more.
2) If the outdoor unit sends a 0 rps signal to the indoor unit 3 times or more within 20 minutes of the power being turned on.

(l) Rotor lock

If the motor for the compressor does not turn after it has been started, it is determined that a compressor lock has occurred and the compressor is stopped.

(m) Outdoor fan motor protection

If the outdoor fan motor has operated at 75 rpm or under for more than 30 seconds, the compressor and fan motor are stopped.

(n) Outdoor fan control at low outdoor temperature

◆ **Cooling**

1) Operating conditions: When the outdoor air temperature (TH2) is 22ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: After the outdoor fan operates at A speed for 60 seconds; the corresponding outdoor heat exchanger temperature shall implement the following controls.

● Value of A

	Outdoor fan
Outdoor temperature > 10˚C	2nd speed
Outdoor temperature ≦ 10˚C	1st speed

a) Outdoor heat exchanger temperature ≦ 21ºC
After the outdoor fan speed drops (down) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is lower than 21ºC, gradually reduce the outdoor fan speed by 1 speed. (Lower limit 1st speed)

b) 21ºC < Outdoor heat exchanger temperature ≦ 38ºC
After the outdoor fan speed maintains at A speed for 20 seconds; if the outdoor heat exchanger temperature is 21ºC~ 38ºC, maintain outdoor fan speed.

c) Outdoor heat exchanger tempeature > 38ºC
After the outdoor fan speed rises (up) to 1 speed for 60 seconds; if the outdoor heat exchanger temperature is higher than 38ºC, gradually increase outdoor fan speed by 1 speed. (Upper limit 3rd speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 25ºC or higher.
b) The compressor command speed is 0 rps.

◆ **Heating**

1) Operating conditions: When the outdoor air temperature (TH2) is 4ºC or lower continues for 30 seconds while the compressor command speed is other than 0 rps.

2) Detail of operation: The outdoor fan is stepped up by 2 speed step at each 20 seconds. (Upper limit 8th speed)

3) Reset conditions: When either of the following conditions is satisfied

a) The outdoor air temperature (TH2) is 6ºC or higher.
b) The compressor command speed is 0 rps.

(o) Refrigeration cycle system protection

1) Starting conditions

a) When 5 minutes have elapsed after the compressor ON or the completion of the defrost control

b) Other than the defrost control

c) When, after meeting the conditions of a) and b) above, the compressor speed, indoor air temperature (Th1) and indoor heat exchanger temperature (Th2) have met the conditions in the following table for 5 minutes:

Operation mode	Compressor speed (N)	Indoor air temperature (Th1)	Indoor air temperature (Th1)/ Indoor heat exchanger temperature (Th2)
Cooling	50≦N	10≦Th1≦40	Th1−4<Th2
Heating	50≦N	0≦Th1≦40	Th2<Th1+6

2) Contents of control

a) When the conditions of 1) above are met, the compressor stops.

b) Error stop occurs when the compressor has stopped 3 times within 60 minutes.

3) Resetting condition

When the compressor has been turned OFF

11 MAINTENANCE DATA

11.1 SRK, SRF and SRR series

(1) Cautions

(a) If you are disassembling and checking an air conditioner, be sure to turn off the power before beginning. When working on indoor units, let the unit sit for about 1 minute after turning off the power before you begin work. When working on an outdoor unit, there may be an electrical charge applied to the main circuit (electrolytic condenser), so begin work only after discharging this electrical charge (to DC 10 V or lower).

(b) When taking out printed circuit boards, be sure to do so without exerting force on the circuit boards or package components.

(c) When disconnecting and connecting connectors, take hold of the connector housing and do not pull on the lead wires.

(2) Items to check before troubleshooting

(a) Have you thoroughly investigated the details of the trouble which the customer is complaining about?

(b) Is the air conditioner running? Is it displaying any self-diagnosis information?

(c) Is a power supply with the correct voltage connected?

(d) Are the control lines connecting the indoor and outdoor units wired correctly and connected securely?

(e) Is the outdoor unit's service valve open?

(3) Troubleshooting procedure (If the air conditioner does not run at all)

If the air conditioner does not run at all, diagnose the trouble using the following troubleshooting procedure. If the air conditioner is running but breaks down, proceed to troubleshooting step (4).

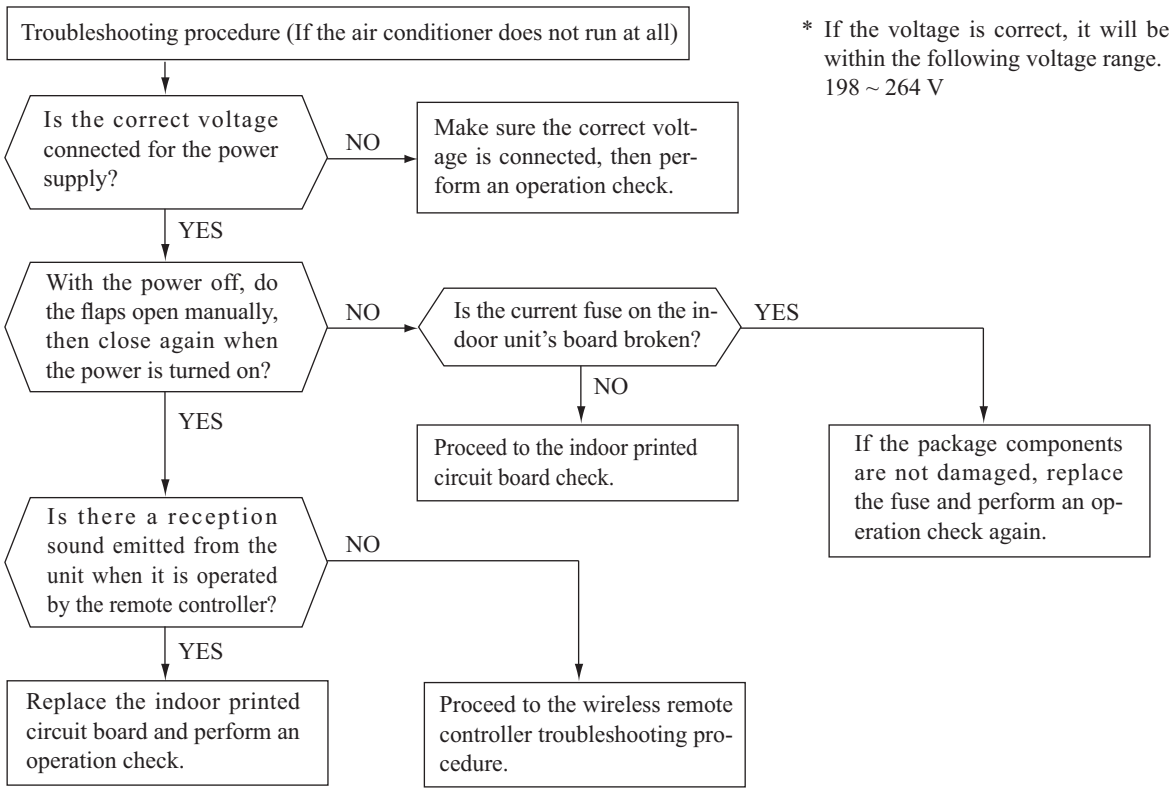
Important When all the following conditions are met, we say that the air conditioner will not run at all.

(a) The RUN light does not light up.

(b) The flaps do not open.

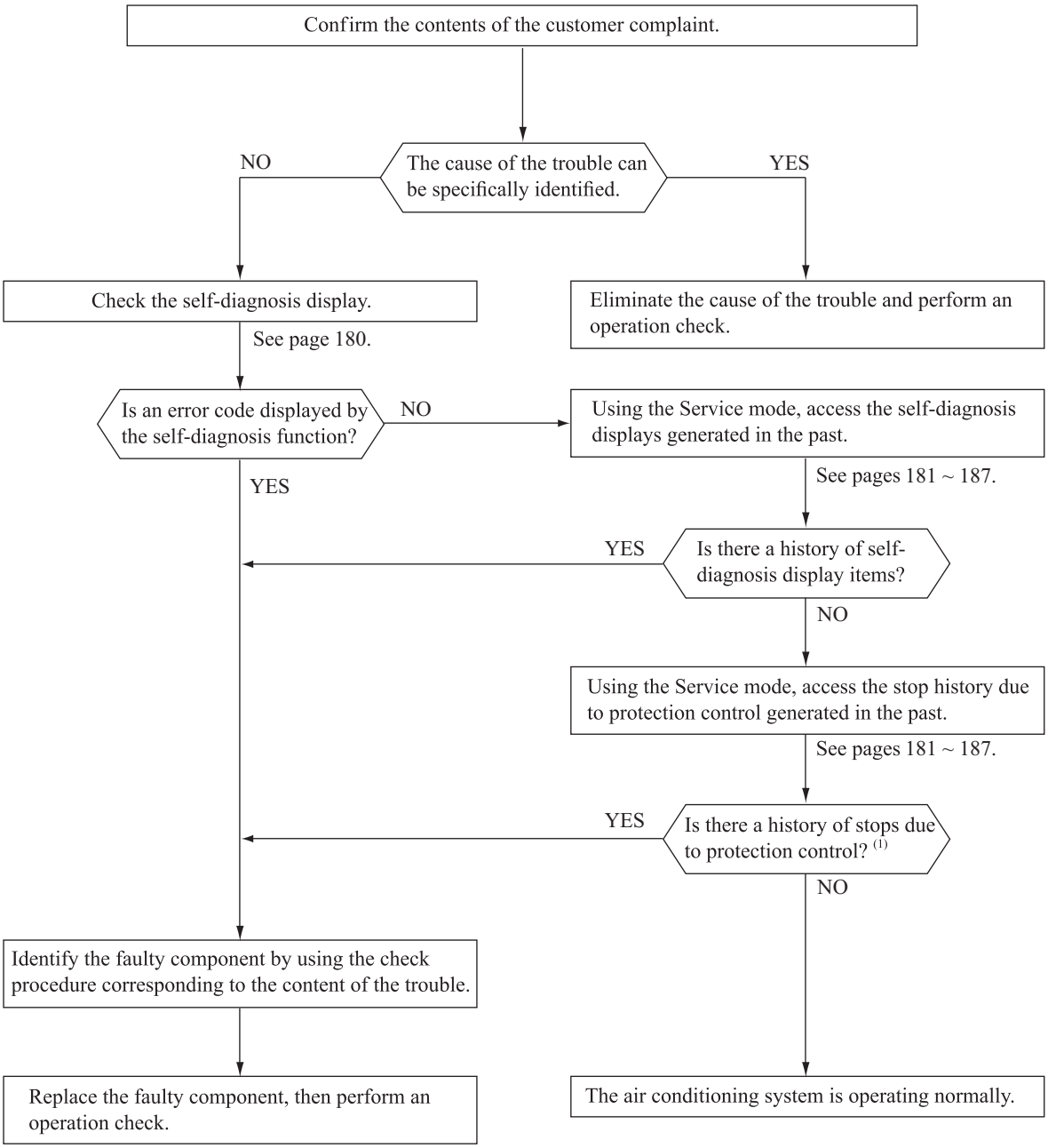
(c) The indoor unit fan motors do not run.

(d) The self-diagnosis display does not function.


Troubleshooting procedure (If the air conditioner does not run at all)
Is the correct voltage connected for the power supply?
NO
Make sure the correct voltage is connected, then perform an operation check.
YES
With the power off, do the flaps open manually, then close again when the power is turned on?
NO
Is the current fuse on the indoor unit's board broken?
YES
NO
Proceed to the indoor printed circuit board check.
If the package components are not damaged, replace the fuse and perform an operation check again.
YES
Is there a reception sound emitted from the unit when it is operated by the remote controller?
NO
YES
Replace the indoor printed circuit board and perform an operation check.
Proceed to the wireless remote controller troubleshooting procedure.

* If the voltage is correct, it will be within the following voltage range.
198 ~ 264 V

(4) Troubleshooting procedure (If the air conditioner runs)


Confirm the contents of the customer complaint.
The cause of the trouble can be specifically identified.
NO
YES
Check the self-diagnosis display.
See page 180.
Eliminate the cause of the trouble and perform an operation check.
Is an error code displayed by the self-diagnosis function?
NO
YES
Using the Service mode, access the self-diagnosis displays generated in the past.
See pages 181 ~ 187.
Is there a history of self-diagnosis display items?
YES
NO
Using the Service mode, access the stop history due to protection control generated in the past.
See pages 181 ~ 187.
Is there a history of stops due to protection control? (1)
YES
NO
Identify the faulty component by using the check procedure corresponding to the content of the trouble.
Replace the faulty component, then perform an operation check.
The air conditioning system is operating normally.

Note (1) Even in cases where only intermittent stop data are generated, the air conditioning system is normal. However, if the same protective operation recurs repeatedly (3 or more times), it will lead to customer complaints. Judge the conditions in comparison with the contents of the complaints.

(5) Self-diagnosis table

When this air conditioner performs an emergency stop, the reason why the emergency stop occurred is displayed by the flashing of display lights. If the air conditioner is operated using the remote controller 3 minutes or more after the emergency stop, the trouble display stops and the air conditioner resumes operation. (1)

Indoor unit display panel		Wired (2) remote controller display	Description of trouble	Cause	Display (flashing) condition
RUN light	TIMER light				
1 time flash	ON	—	Heat exchanger sensor 1 error	• Broken heat exchanger sensor 1 wire, poor connector connection • Indoor PCB is faulty	When a heat exchanger sensor 1 wire disconnection is detected while operation is stopped. (If a temperature of –28ºC or lower is detected for 15 seconds, it is judged that the wire is disconnected.) (Not displayed during operation.)
2 time flash	ON	—	Room temperature sensor error	• Broken room temperature sensor wire, poor connector connection • Indoor PCB is faulty	When a room temperature sensor wire disconnection is detected while operation is stopped. (If a temperature of –45ºC or lower is detected for 15 seconds, it is judged that the wire is disconnected.) (Not displayed during operation.)
3 time flash	ON	—	Heat exchanger sensor 2 error	• Broken heat exchanger sensor 2 wire, poor connector connection • Indoor PCB is faulty	When a heat exchanger sensor 2 wire disconnection is detected while operation is stopped. (If a temperature of –28ºC or lower is detected for 15 seconds, it is judged that the wire is disconnected.) (Not displayed during operation.)
4 time flash	ON	E 9	Drain(3) trouble	• Defective drain pump (DM), broken drain pump wire • Anomalous float switch operation • Defective indoor PCB faulty	If the float switch OPEN is defected for 3 seconds continuously or if float switch connector or wire is disconnected.
6 time flash	ON	E 16	Indoor fan motor error	• Defective fan motor, poor connector connection	When conditions for turning the indoor unit's fan motor on exist during air conditioner operation, an indoor unit fan motor speed of 300 (SRF : 150) rpm or lower is measured for 30 seconds or longer. (The air conditioner stops.)
Keeps flashing	1 time flash	E 38	Outdoor air temperature sensor error	• Broken outdoor air temp. sensor wire, poor connector connection • Outdoor PCB is faulty	–55ºC or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or –55ºC or higher is detected for within 20 seconds after power ON. (The compressor is stopped.)
Keeps flashing	2 time flash	E 37	Outdoor heat exchanger sensor error	• Broken heat exchanger sensor wire, poor connector connection • Outdoor PCB is faulty	–55ºC or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or –55ºC or higher is detected for within 20 seconds after power ON. (The compressor is stopped.)
Keeps flashing	4 time flash	E 39	Discharge pipe sensor error	• Broken discharge pipe sensor wire, poor connector connection • Outdoor PCB is faulty	–25ºC or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. (The compressor is stopped.)
ON	1 time flash	E 42	Current cut	• Compressor locking, open phase on compressor output, short circuit on power transistor, service valve is closed	The compressor output current exceeds the set value during compressor start. (The air conditioner stops.)
ON	2 time flash	E 59	Trouble of outdoor unit	• Broken compressor wire • Compressor blockage	When there is an emergency stop caused by trouble in the outdoor unit, or the input current value is found to be lower than the set value. (The air conditioner stops.)
ON	3 time flash	E 58	Current safe stop	• Overload operation • Overcharge • Compressor locking	When the compressor command speed is lower than the set value and the current safe has operated. (the compressor stops)
ON	4 time flash	E 51	Power transistor error	• Broken power transistor	When the power transistor is judged breakdown while compressor starts. (The compressor is stopped.)
ON	5 time flash	E 36	Over heat of compressor	• Gas shortage, defective discharge pipe sensor, service valve is closed	When the value of the discharge pipe sensor exceeds the set value. (The air conditioner stops.)
ON	6 time flash	E 5	Error of signal transmission	• Defective power supply, Broken signal wire, defective indoor/outdoor PCB	When there is no signal between the indoor PCB and outdoor PCB for 10 seconds or longer (when the power is turned on), or when there is no signal for 7 minute 35 seconds or longer (during operation)(the compressor is stopped).
ON	7 time flash	E 48	Outdoor fan motor error	• Defective fan motor, poor connector connection	When the outdoor unit's fan motor speed continues for 30 seconds or longer at 75 rpm or lower. (3 times) (The air conditioner stops.)
ON	Keeps flashing	E 35	Cooling high pressure protecton	• Overload operation, overcharge • Broken outdoor heat exchange sensor wire • Service valve is closed	When the value of the outdoor heat exchanger sensor exceeds the set value.
2 time flash	2 time flash	E 60	Rotor lock	• Defective compressor • Open phase on compressor • Defective outdoor PCB	If the compressor motor's magnetic pole positions cannot be correctly detected when the compressor starts. (The air conditioner stops.)
5 time flash	ON	E 47	Active filter voltage error	• Defective active filter	When the wrong voltage connected for the power supply. When the outdoor PCB is faulty.
7 time flash	ON	E 57	Refrigeration cycle system protective control	• Service valve is closed. • Refrigerant is insufficient	When refrigeration cycle system protective control operates.
—	—	E 1	Error of wired remote controller wiring	• Broken wired remote controller wire, defective indoor PCB	The wired remote controller wire Y is open. The wired remote controller wires X and Y are reversely connected. Noise is penetrating the wired remote controller lines. The wired remote controller or indoor PCB is faulty. (The communications circuit is faulty.)

Notes (1)The air conditioner cannot be restarted using the remote controller for 3 minutes after operation stops.
(2)The wired remote controller is optional parts.
(3)SRR series only.

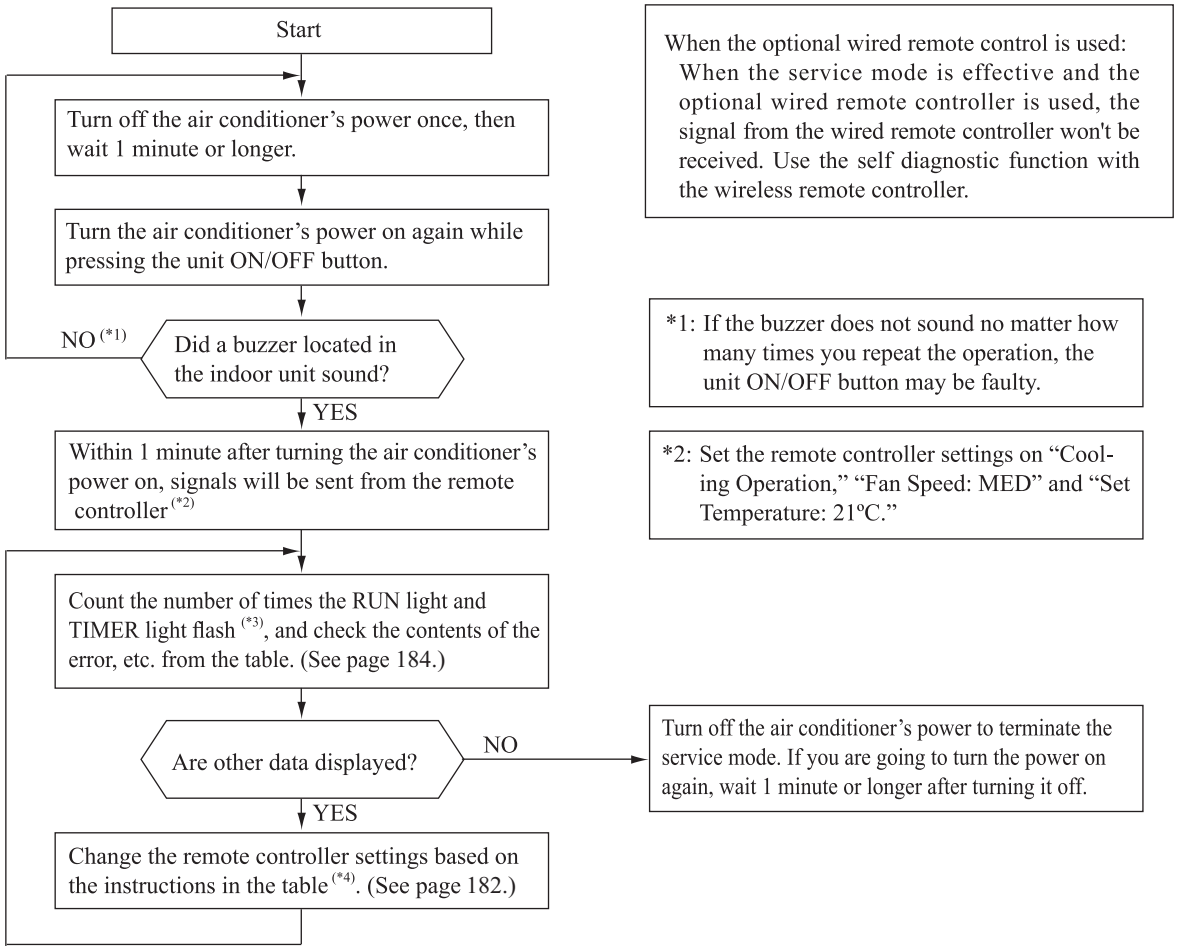
(6) Service mode (Trouble mode access function)

This air conditioner is capable of recording error displays and protective stops (service data) which have occurred in the past. If self-diagnosis displays cannot be confirmed, it is possible to get a grasp of the conditions at the time trouble occurred by checking these service data.

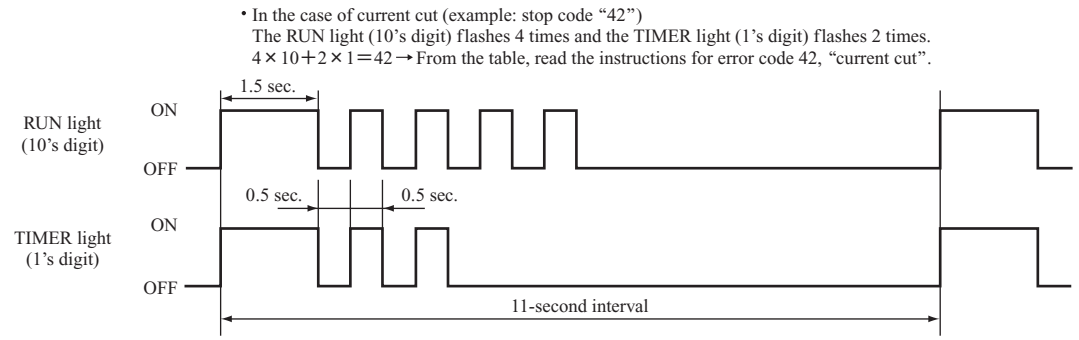
(a) Explanation of terms

Term	Explanation
Service mode	The service mode is the mode where service data are displayed by flashing of the display lights when the operations in item (b) below are performed with the indoor controller.
Service data	These are the contents of error displays and protective stops which occurred in the past in the air conditioner system. Error display contents and protective stop data from past anomalous operations of the air conditioner system are saved in the indoor unit controller's non-volatile memory (memory which is not erased when the power goes off). There are two types of data, self-diagnosis data and stop data, described below.
Self-diagnosis data	These are the data which display the reason why a stop occurred when an error display(self-diagnosis display) occurred in an indoor unit. Data are recorded for up to 5 previous occurrences. Data which are older than the 5th previous occurrence are erased. In addition, data on the temperature of each sensor (room temperature, indoor heat exchanger, outdoor heat exchanger, outdoor air temperature, discharge pipe), remote controller information (operation switching, fan speed switching) are recorded when trouble occurs, so more detailed information can be checked.
Stop data	These are the data which display the reason by a stop occurred when the air conditioning system performed protective stops, etc. in the past. Even if stop data alone are generated, the system restarts automatically. (After executing the stop mode while the display is normal, the system restarts automatically.) Data for up to 10 previous occasions are stored. Data older than the 10th previous occasion are erased. (Important) In cases where transient stop data only are generated, the air conditioner system may still be normal. However, if the same protective stop occurs frequently (3 or more times), it could lead to customer complaints.

(b) Service mode display procedure


Start
Turn off the air conditioner's power once, then wait 1 minute or longer.
Turn the air conditioner's power on again while pressing the unit ON/OFF button.
NO (*1)
Did a buzzer located in the indoor unit sound?
YES
Within 1 minute after turning the air conditioner's power on, signals will be sent from the remote controller (*2)
Count the number of times the RUN light and TIMER light flash (*3), and check the contents of the error, etc. from the table. (See page 184.)
Are other data displayed?
NO
YES
Change the remote controller settings based on the instructions in the table (*4). (See page 182.)
When the optional wired remote control is used: When the service mode is effective and the optional wired remote controller is used, the signal from the wired remote controller won't be received. Use the self diagnostic function with the wireless remote controller.
*1: If the buzzer does not sound no matter how many times you repeat the operation, the unit ON/OFF button may be faulty.
*2: Set the remote controller settings on "Cooling Operation," "Fan Speed: MED" and "Set Temperature: 21ºC."
Turn off the air conditioner's power to terminate the service mode. If you are going to turn the power on again, wait 1 minute or longer after turning it off.

*3: To count the number of flashes in the service mode, count the number of flashes after the light lights up for 1.5 second initially (start signal). (The time that the light lights up for 1.5 second (start signal) is not counted in the number of flashes.)


• In the case of current cut (example: stop code "42")
The RUN light (10's digit) flashes 4 times and the TIMER light (1's digit) flashes 2 times.
4 × 10 + 2 × 1 = 42 → From the table, read the instructions for error code 42, "current cut".
1.5 sec.
RUN light (10's digit)
ON
OFF
0.5 sec.
0.5 sec.
TIMER light (1's digit)
ON
OFF
11-second interval

*4: When in the service mode, when the remote controller settings (operation switching, fan speed switching, temperature setting) are set as shown in the following table and sent to the air conditioner unit, the unit switches to display of service data.

1) Self-diagnosis data

What are Self-diagnosis Data? .....These are control data (reasons for stops, temperature at each sensor, remote controller information) from the time when there were error displays (abnormal stops) in the indoor unit in the past.

Data from up to 5 previous occasions are stored in memory. Data older than the 5th previous occasion are erased.

The temperature setting indicates how many occasions previous to the present setting the error display data are and the operation switching and fan speed switching data show the type of data.

Remote controller setting		Contents of output data
Operation switching	Fan speed switching	
Cooling	MED	Displays the reason for stopping display in the past (error code).
	HI	Displays the room temperature sensor temperature at the time the error code was displayed in the past.
	AUTO	Displays the indoor heat exchanger sensor temperature at the time the error code was displayed in the past.
Heating	LO	Displays the remote controller information at the time the error code was displayed in the past.
	MED	Displays the outdoor air temperature sensor temperature at the time the error code was displayed in the past.
	HI	Displays the outdoor heat exchanger sensor temperature at the time the error code was displayed in the past.
	AUTO	Displays the discharge pipe sensor temperature at the time the error code was displayed in the past.

Remote controller setting	Indicates the number of occasions previous to the present the error display data are from.
Temperature setting	
21ºC	1 time previous (previous time)
22ºC	2 times previous
23ºC	3 times previous
24ºC	4 times previous
25ºC	5 times previous

Only for indoor heat exchanger sensor 2

Remote controller setting	Indicates the number of occasions previous to the present the error display data are from.
Temperature setting	
26ºC	1 time previous (previous time)
27ºC	2 times previous
28ºC	3 times previous
29ºC	4 times previous
30ºC	5 times previous

(Example)

Remote controller setting			Displayed data
Operation switching	Fan speed switching	Temperature setting	
Cooling	MED	21ºC	Displays the reason for the stop (error code) the previous time an error was displayed.
		22ºC	Displays the reason for the stop (error code) 2 times previous when an error was displayed.
		23ºC	Displays the reason for the stop (error code) 3 times previous when an error was displayed.
		24ºC	Displays the reason for the stop (error code) 4 times previous when an error was displayed.
		25ºC	Displays the reason for the stop (error code) 5 times previous when an error was displayed.

2) Stop data

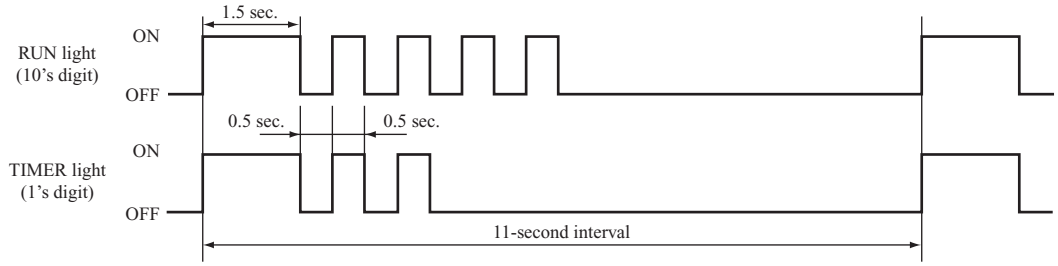
Remote controller setting			Displayed data
Operation switching	Fan speed switching	Temperature setting	
Cooling	LO	21ºC	Displays the reason for the stop (stop code) the previous time when the air conditioner was stopped by protective stop control.
		22ºC	Displays the reason for the stop (stop code) 2 times previous when the air conditioner was stopped by protective stop control.
		23ºC	Displays the reason for the stop (stop code) 3 times previous when the air conditioner was stopped by protective stop control.
		24ºC	Displays the reason for the stop (stop code) 4 times previous when the air conditioner was stopped by protective stop control.
		25ºC	Displays the reason for the stop (stop code) 5 times previous when the air conditioner was stopped by protective stop control.
		26ºC	Displays the reason for the stop (stop code) 6 times previous when the air conditioner was stopped by protective stop control.
		27ºC	Displays the reason for the stop (stop code) 7 times previous when the air conditioner was stopped by protective stop control.
		28ºC	Displays the reason for the stop (stop code) 8 times previous when the air conditioner was stopped by protective stop control.
		29ºC	Displays the reason for the stop (stop code) 9 times previous when the air conditioner was stopped by protective stop control.
		30ºC	Displays the reason for the stop (stop code) 10 times previous when the air conditioner was stopped by protective stop control.

(c) Error code, stop code table (Assignment of error codes and stop codes is done in common for all models.)

Number of flashes when in service mode		Stop coad or Error coad	Error content	Cause	Occurrence conditions	Error display	Auto recovery
RUN light (10's digit)	TIMER light (1's digit)						
OFF	OFF	0	Normal	—	—	—	—
OFF	5 time flash	05	Can not receive signals for 35 seconds (if communications have recovered)	Power supply is faulty. Power supply cables and signal lines are improperly wired. Indoor or outdoor PCB are faulty.	When 35 seconds passes without communications signals from either the outdoor unit or the indoor unit being detected correctly.	○	—
3 time flash	5 time flash	35	Cooling high pressure control	Cooling overload operation. Outdoor unit fan speed drops. Outdoor heat exchanger sensor is short circuit.	When the outdoor heat exchanger sensor's value exceeds the set value.	○ (5 times)	○
	6 time flash	36	Compressor overheat 110°C (SRC 50, 60ZIX-S : 115°C)	Refrigerant is insufficient. Discharge pipe sensor is faulty. Service valve is closed.	When the discharge pipe sensor's value exceeds the set value.	○ (2 times)	○
	7 time flash	37	Outdoor heat exchanger sensor is abnormal	Outdoor heat exchanger sensor wire is disconnected. Connector connections are poor. Outdoor PCB is faulty.	–55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after intial detection of this anomalous temperature. Or–55°C higher is detected for 5 seconds continuously within 20 seconds after power ON.	○ (3 times)	○
	8 time flash	38	Outdoor air temperature sensor is abnormal	Outdoor air temperature sensor wire is disconnected. Connector connections are poor. Outdoor PCB is faulty.	–55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after intial detection of this anomalous temperature. Or–55°C higher is detected for 5 seconds continuously within 20 seconds after power ON.	○ (3 times)	○
	9 time flash	39	Discharge pipe sensor is abnormal (anomalous stop)	Discharge pipe sensor wire is disconnected. Connector connections are poor. Outdoor PCB is faulty.	–25°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after intial detection of this anomalous temperature.	○ (3 times)	○
4 time flash	2 time flash	42	Current cut	Compressor lock. Compressor wiring short circuit. Compressor output is open phase. Outdoor PCB is faulty. Service valve is closed. Electronic expansion valve is faulty. Compressor is faulty.	Compressor start fails 42 times in succession and the reason for the final failure is current cut.	○ (2 times)	○
	7 time flash	47	Active filter voltage error	Defective active filter	When the wrong voltage connected for the power supply. When the outdoor PCB is faulty.	○	—
	8 time flash	48	Outdoor unit's fan motor is abnormal	Outdoor fan motor is faulty. Connector connections are poor. Outdoor PCB is faulty.	When a fan speed of 75 rpm or lower continues for 30 seconds or longer.	○ (3 times)	○
5 time flash	1 time flash	51	Short circuit in the power transistor (high side) Current cut circuit breakdown	Outdoor PCB is faulty. Power transistor is damaged.	When it is judged that the power transistor was damaged at the time the compressor started.	○	—
	3 time flash	53	Suction pipe sensor is abnormal (Multi system only)	Suction pipe sensor wire is disconnected. Connector connections are poor. Outdoor PCB is faulty.	–55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after intial detection of this anomalous temperature. Or–55°C higher is detected for 5 seconds continuously within 20 seconds after compressor ON.	○ (3 times)	○
	7 time flash	57	Refrigeration cycle system protective control	Service valve is closed. Refrigerant is insufficient.	When refrigeration cycle system protective control operates.	○ (3 times)	○
	8 time flash	58	Current safe	Refrigerant is overcharge. Compressor lock. Overload operation.	When there is a current safe stop during operation.	—	○
	9 time flash	59	Compressor wiring is unconnection Voltage drop Low speed protective control	Compressor wiring is disconnected. Power transistor is damaged. Power supply construction is defective. Outdoor PCB is faulty. Compressor is faulty.	When the current is 1A or less at the time the compressor started. When the power supply voltage drops during operation. When the compressor command speed is 1ower than 32 rps for 60 minutes.	○	○
6 time flash	OFF	60	Rotor lock	Compressor is faulty. Compressor output is open phase. Electronic expansion valve is faulty. Overload operation. Outdoor PCB is faulty.	After the compressor starts, when the compressor stops due to rotor lock.	○ (2 times)	○
	1 time flash	61	Connection lines between the indoor and outdoor units are faulty	Connection lines are faulty. Indoor or outdoor PCB are faulty.	When 10 seconds passes after the power is turned on without communications signals from the indoor or outdoor unit being detected correctly.	○	—
	2 time flash	62	Serial transmission error	Indoor or outdoor PCB are faulty. Noise is causing faulty operation.	When 7 minute 35 seconds passes without communications signals from either the outdoor unit or the indoor unit being detected correctly.	○	—
8 time flash	OFF	80	Indoor unit's fan motor is abnormal	Indoor fan motor is faulty. Connector connections are poor. Indoor PCB is faulty.	When the indoor unit's fan motor is detected to be running at 300 (SRF : 150) rpm or lower speed with the fan motor in the ON condition while the air conditioner is running.	○	—
	2 time flash	82	Indoor heat exchanger sensor is abnormal (anomalous stop)	Indoor heat exchanger sensor wire is disconnected. Connector connections are poor.	When a temperature of –28°C or lower is sensed continuously for 40 minutes during heating operation. (the compressor stops).	○	—
	4 time flash	84	Anti-condensation control	High humidity condition. Humidity sensor is faulty.	Anti-condensation prevention control is operating.	—	○
	5 time flash	85	Anti-frost control	Indoor unit fan speed drops. Indoor heat exchanger sensor is broken wire.	When the anti-frost control operates and the compressor stops during cooling operation.	—	○
	6 time flash	86	Heating high pressure control	Heating overload operation. Indoor unit fan speed drops. Indoor heat exchanger sensor is short circuit.	When high pressure control operates during heating operation and the compressor stops.	—	○

Note (1) The number of flashes when in the Service Mode do not include the 1.5 second period when the lights light up at first (starting signal). (See the example shown below.)

• In the case of current cut (example: stop code "42")
The RUN light (10's digit) flashes 4 times and the TIMER light (1's digit) flashes 2 times.
4 × 10 + 2 × 1 = 42 → From the table, read the instructions for error code 42, "current cut".



(2) Error display: – Is not displayed. (automatic recovery only)
Displayed.
If there is a ( ) displayed, the error display shows the number of times that an auto recovery occurred for the same reason has reached the number of times in ( ).
If no ( ) is displayed, the error display shows that the trouble has occurred once.

(3) Auto Recovery: – Does not occur
Auto recovery occurs.

(d) Remote controller information tables

1) Operation switching

Display pattern when in service mode RUN light (Operation switching)	Operation switching when there is an abnormal stop
0	AUTO
1	DRY
2	COOL
3	FAN
4	HEAT

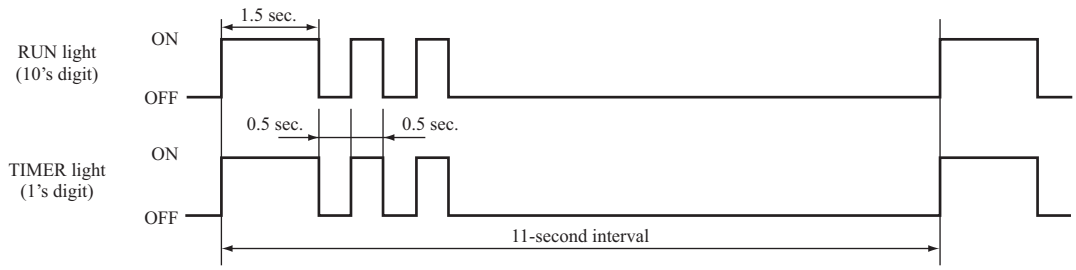
2) Fan speed switching

Display pattern when in service mode TIMER light (Fan speed switching)	Fan speed switching when there is an abnormal stop
0	AUTO
2	HI
3	MED
4	LO
6	HI POWER
7	ECONO

* If no data are recorded (error code is normal), the information display in the remote controller becomes as follows.

Remote controller setting	Display when error code is normal.
Operation switching	AUTO
Fan speed switching	AUTO

(Example): Operation switching, fan speed switching, cooling HI



(e) Room temperature sensor, indoor heat exchanger sensor, outdoor air temperature sensor, outdoor heat exchanger sensor table

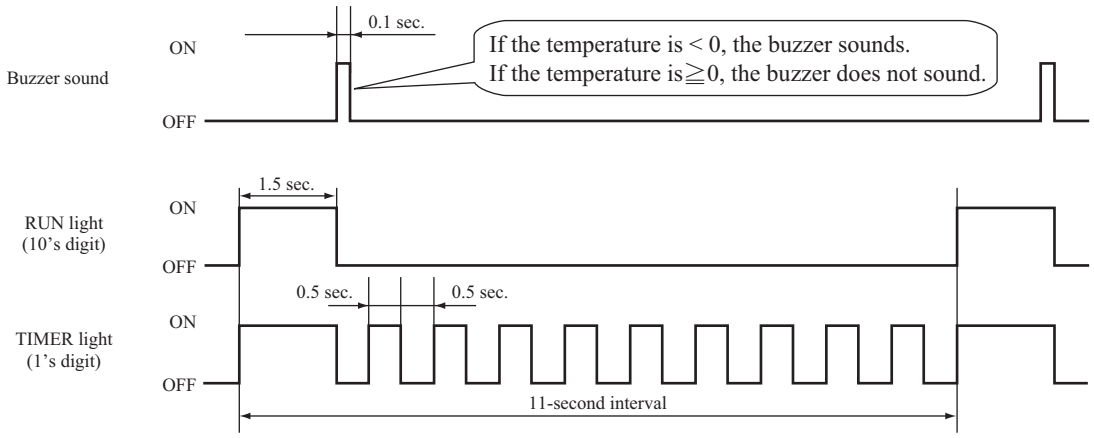
Units: °C

Buzzer sound	RUN light (10's digit) \ TIMER light (1's digit)	0	1	2	3	4	5	6	7	8	9
Yes (sounds for 0.1 second)	6	-60	-61	-62	-63	-64					
	5	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59
	4	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49
	3	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39
	2	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29
	1	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19
	0		-1	-2	-3	-4	-5	-6	-7	-8	-9
No (does not sound)	0	0	1	2	3	4	5	6	7	8	9
	1	10	11	12	13	14	15	16	17	18	19
	2	20	21	22	23	24	25	26	27	28	29
	3	30	31	32	33	34	35	36	37	38	39
	4	40	41	42	43	44	45	46	47	48	49
	5	50	51	52	53	54	55	56	57	58	59
	6	60	61	62	63	64	65	66	67	68	69
	7	70	71	72	73	74	75	76	77	78	79
	8	80	81	82	83	84	85	86	87	88	89
	9	90	91	92	93	94	95	96	97	98	99

* If no data are recorded (error code is normal), the display for each sensor becomes as shown below.

Sensor name	Sensor value displayed when the error code is normal
Room temperature sensor	-64ºC
Indoor heat exchanger sensor	-64ºC
Outdoor air temperature sensor	-64ºC
Outdoor heat exchanger sensor	-64ºC

(Example) Room temperature, indoor heat exchanger, outdoor air temperature, outdoor heat exchanger: "-9ºC"



(f) Discharge pipe sensor table

Units: °C

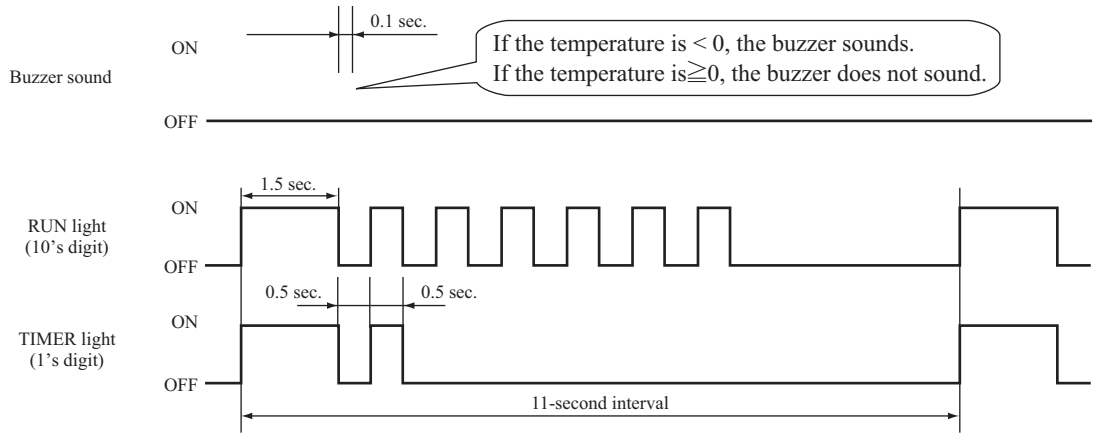
Buzzer sound	RUN light (10's digit) \ TIMER light (1's digit)	0	1	2	3	4	5	6	7	8	9
Yes (sounds for 0.1 second)	3	-60	-62	-64							
	2	-40	-42	-44	-46	-48	-50	-52	-54	-56	-58
	1	-20	-22	-24	-26	-28	-30	-32	-34	-36	-38
	0		-2	-4	-6	-8	-10	-12	-14	-16	-18
No (does not sound)	0	0	2	4	6	8	10	12	14	16	18
	1	20	22	24	26	28	30	32	34	36	38
	2	40	42	44	46	48	50	52	54	56	58
	3	60	62	64	66	68	70	72	74	76	78
	4	80	82	84	86	88	90	92	94	96	98
	5	100	102	104	106	108	110	112	114	116	118
	6	120	122	124	126	128	130	132	134	136	138
	7	140	142	144	146	148	150				

* If no data are recorded (error code is normal), the display for each sensor becomes as shown below.

Sensor name	Sensor value displayed when the error code is normal
Discharge pipe sensor	-64ºC

(Example) Discharge pipe temperature: "122ºC"

* In the case of discharge pipe data, multiply the reading value by 2. (Below, 61 x 2 = "122ºC")



Service data record form

Customer		Model	
Date of investigation			
Machine name			
Content of complaint			

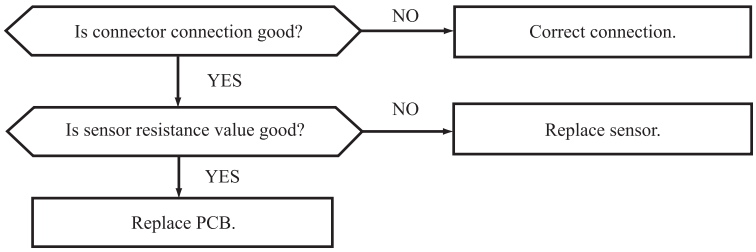
Remote controller settings			Content of displayed data	Display results			Display content
Temperature setting	Operation switching	Fan speed switching		Buzzer (Yes/No.)	RUN light (Times)	TIMER light (Times)	
21	Cooling	MED	Error code on previous occasion.				
		HI	Room temperature sensor on previous occasion.				
		AUTO	Indoor heat exchanger sensor 1 on previous occasion.				
	Heating	LO	Remote controller information on previous occasion.				
		MED	Outdoor air temperature sensor on previous occasion.				
		HI	Outdoor heat exchanger sensor on previous occasion.				
		AUTO	Discharge pipe sensor on previous occasion.				
26	Cooling	AUTO	Indoor heat exchanger sensor 2 on previous occasion.				
22	Cooling	MED	Error code on second previous occasion.				
		HI	Room temperature sensor on second previous occasion.				
		AUTO	Indoor heat exchanger sensor 1 on second previous occasion.				
	Heating	LO	Remote controller information on second previous occasion.				
		MED	Outdoor air temperature sensor on second previous occasion.				
		HI	Outdoor heat exchanger sensor on second previous occasion.				
		AUTO	Discharge pipe sensor on second previous occasion.				
27	Cooling	AUTO	Indoor heat exchanger sensor 2 on second occasion.				
23	Cooling	MED	Error code on third previous occasion.				
		HI	Room temperature sensor on third previous occasion.				
		AUTO	Indoor heat exchanger sensor 1 on third previous occasion.				
	Heating	LO	Remote controller information on third previous occasion.				
		MED	Outdoor air temperature sensor on third previous occasion.				
		HI	Outdoor heat exchanger sensor on third previous occasion.				
		AUTO	Discharge pipe sensor on third previous occasion.				
28	Cooling	AUTO	Indoor heat exchanger sensor 2 on third occasion.				
24	Cooling	MED	Error code on fourth previous occasion.				
		HI	Room temperature sensor on fourth previous occasion.				
		AUTO	Indoor heat exchanger sensor 1 on fourth previous occasion.				
	Heating	LO	Remote controller information on fourth previous occasion.				
		MED	Outdoor air temperature sensor on fourth previous occasion.				
		HI	Outdoor heat exchanger sensor on fourth previous occasion.				
		AUTO	Discharge pipe sensor on fourth previous occasion.				
29	Cooling	AUTO	Indoor heat exchanger sensor 2 on fouth occasion.				
25	Cooling	MED	Error code on fifth previous occasion.				
		HI	Room temperature sensor on fifth previous occasion.				
		AUTO	Indoor heat exchanger sensor 1 on fifth previous occasion.				
	Heating	LO	Remote controller information on fifth previous occasion.				
		MED	Outdoor air temperature sensor on fifth previous occasion.				
		HI	Outdoor heat exchanger sensor on fifth previous occasion.				
		AUTO	Discharge pipe sensor on fifth previous occasion.				
30	Cooling	AUTO	Indoor heat exchanger sensor 2 on fifth occasion.				
21	Cooling	Lo	Stop code on previous occasion.				
22			Stop code on second previous occasion.				
23			Stop code on third previous occasion.				
24			Stop code on fourth previous occasion.				
25			Stop code on fifth previous occasion.				
26			Stop code on sixth previous occasion.				
27			Stop code on seventh previous occasion.				
28			Stop code on eighth previous occasion.				
29			Stop code on ninth previous occasion.				
30			Stop code on tenth previous occasion.				
Judgment							Examiner
Remarks							

Note (1) In the case of indoor heat exchanger sensor 2, match from 26 to 30 the temperature setting of remote controller. (Refor to page 182)

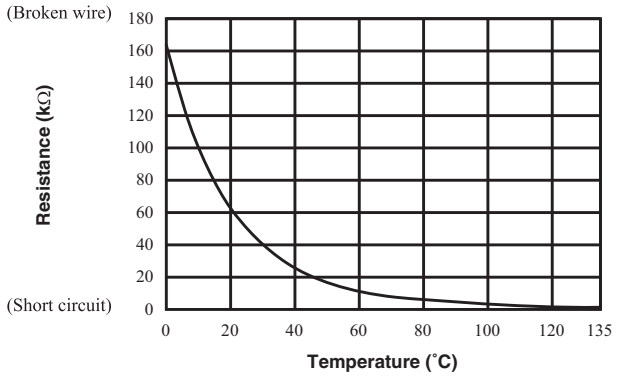
(7) Inspection procedures corresponding to detail of trouble

Sensor error

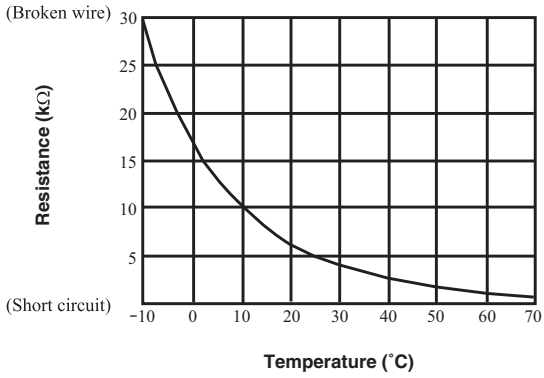
[Broken sensor wire, connector poor connection]



◆ **Discharge pipe sensor temperature characteristics**

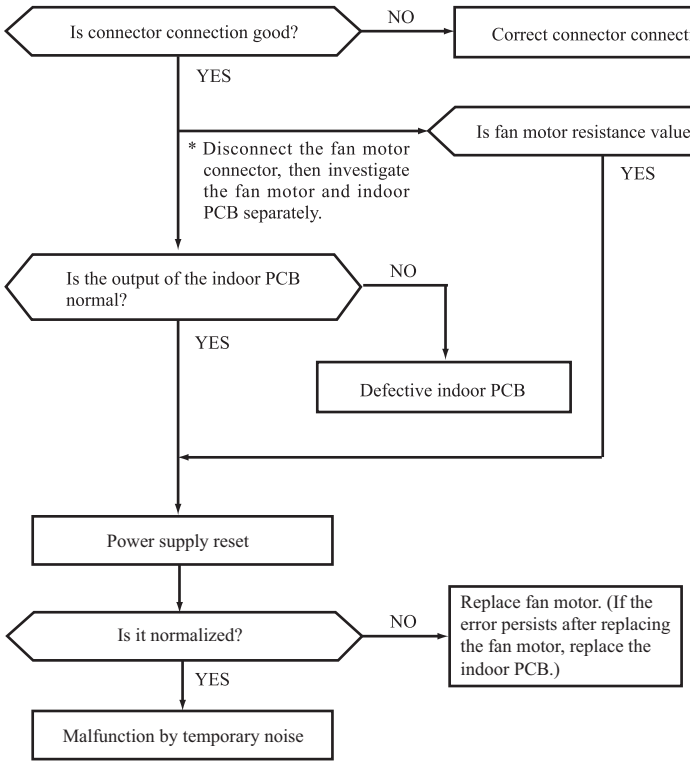


◆ **Sensor temperature characteristics (Room temp., indoor heat exchanger temp., outdoor heat exchanger temp., outdoor air temp.)**



Indoor fan motor error

[Defective fan motor, connector poor connection, defective indoor PCB]

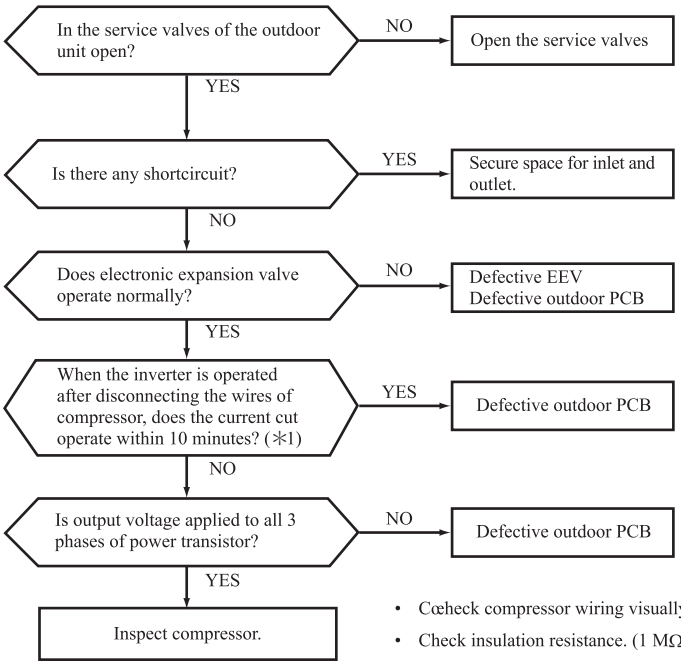

Is connector connection good?
NO
Correct connector connection
YES
* Disconnect the fan motor connector, then investigate the fan motor and indoor PCB separately.
Is fan motor resistance value good?
NO
YES
Replace indoor fan motor
Is the output of the indoor PCB normal?
NO
YES
Defective indoor PCB
Power supply reset
Is it normalized?
NO
Replace fan motor. (If the error persists after replacing the fan motor, replace the indoor PCB.)
YES
Malfunction by temporary noise

Notes (1) See pages 194 for the fan motor and indoor PCB check procedure.

(2) After making sure the fan motor and indoor PCB are normal, connect the connectors and confirm that the fan motor is turning.
(If power is turned on while one or the other is broken down, it could cause the other to break down also.)

Current cut

[Compressor lock, Compressor wiring short circuit, Compressor output is open phase, Outdoor PCB is faulty, Service valve is closed, EEV is faulty, Compressor faulty.]



For inspection of electronic expansion valve, see page 198

∗1 If it is normal, it is the rotor lock problem.

For the output voltage check of power transistor, see page 195

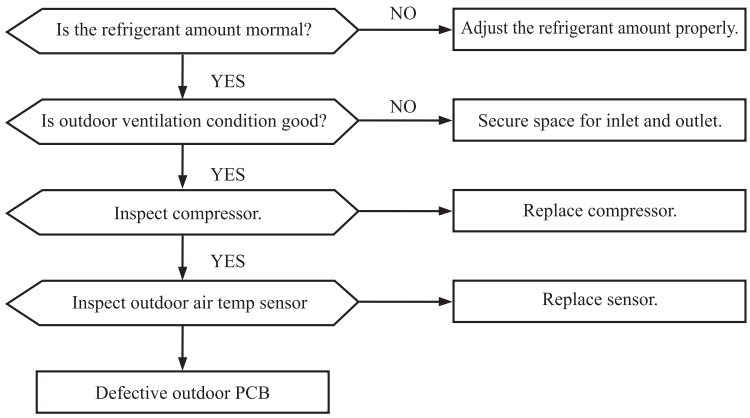
- Cœheck compressor wiring visually.
- Check insulation resistance. (1 MΩ or over)
- Check coil wire resistance.

If check results are normal, compressor is locked.

SRC20 ~ 35 : 1.703Ω (U-V, V-W, U-W) or more at 20ºC
SRC50ZJ-S : 1.417Ω (U-V), 1.392Ω (V-W), 1.435Ω (U-W) or more at 20ºC
SRC50, 60ZIX-S : 0.953Ω (U-V, V-W, U-W) or more at 20ºC

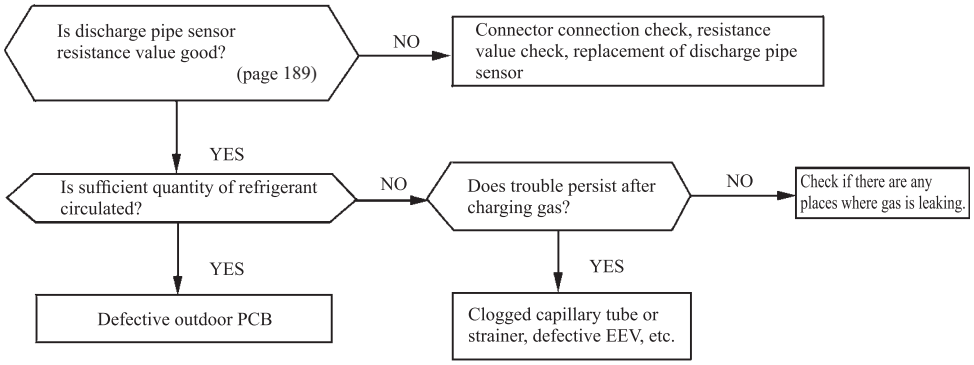
Current safe stop

[Overload operation, compressor lock, overcharge]



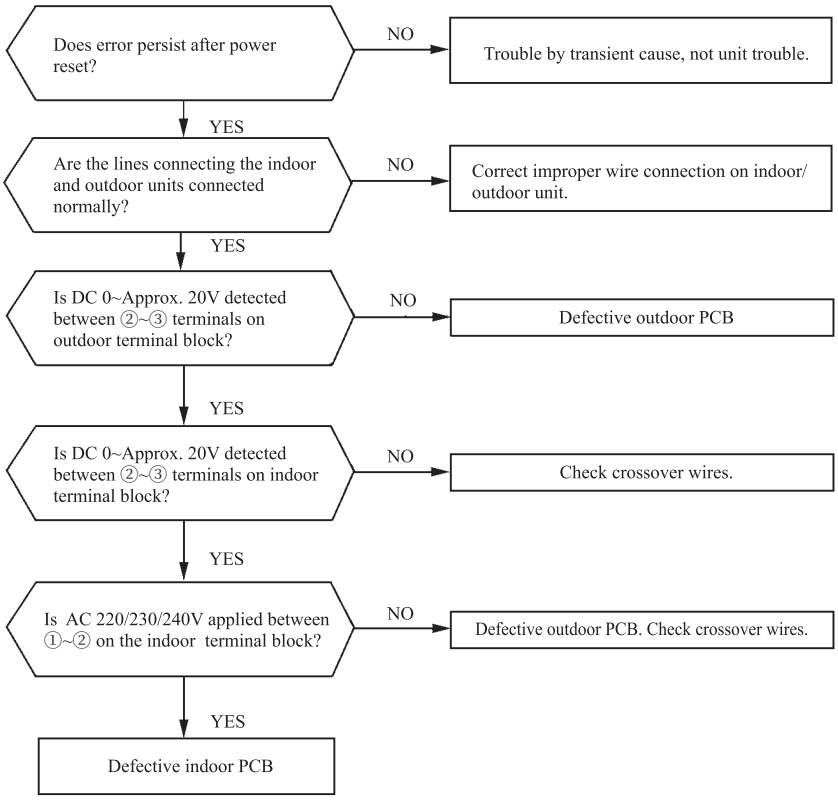
Over heat of compressor

[Gas shortage, defective discharge pipe sensor]


Is discharge pipe sensor resistance value good? (page 189)
NO
Connector connection check, resistance value check, replacement of discharge pipe sensor
YES
Is sufficient quantity of refrigerant circulated?
NO
Does trouble persist after charging gas?
NO
Check if there are any places where gas is leaking.
YES
YES
Defective outdoor PCB
Clogged capillary tube or strainer, defective EEV, etc.

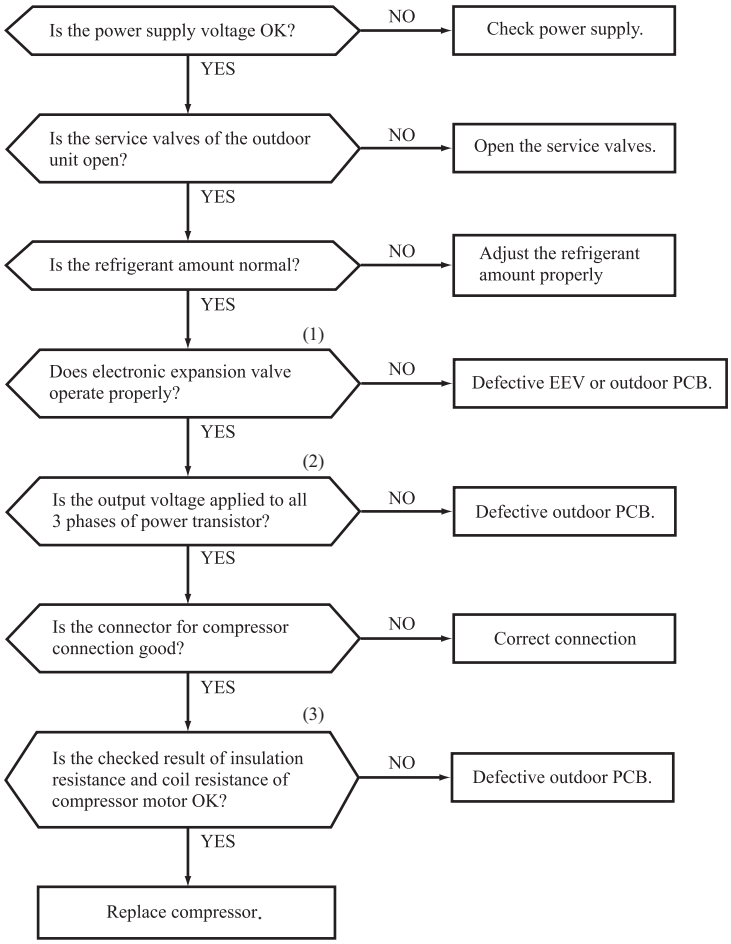
Error of signal transmission

[Wiring error including power cable, defective indoor/outdoor PCB]


Does error persist after power reset?
NO
Trouble by transient cause, not unit trouble.
YES
Are the lines connecting the indoor and outdoor units connected normally?
NO
Correct improper wire connection on indoor/ outdoor unit.
YES
Is DC 0~Approx. 20V detected between ②~③ terminals on outdoor terminal block?
NO
Defective outdoor PCB
YES
Is DC 0~Approx. 20V detected between ②~③ terminals on indoor terminal block?
NO
Check crossover wires.
YES
Is AC 220/230/240V applied between ①~② on the indoor terminal block?
NO
Defective outdoor PCB. Check crossover wires.
YES
Defective indoor PCB

Trouble of outdoor unit

[Insufficient refregerant amount, Faulty power transistor, Broken compressor wire Service valve close, Defective EEV, Defective outdoor PCB]



Proper power supply voltages are as follows.
(At the power supply outlet)
220V : 198~242V
230V : 207~253V
240V : 216~264V

◆ Judgment of refrigerant quantity

(1) Phenomenon of insufficient refrigerant

(a) Loss of capacity

(b) Poor defrosting

(Frost is not removed completely.)

(c) Longer time of hot keep

(5 minute or more)

(Normal time: Approx. 1 – 1 minute and 30 seconds)

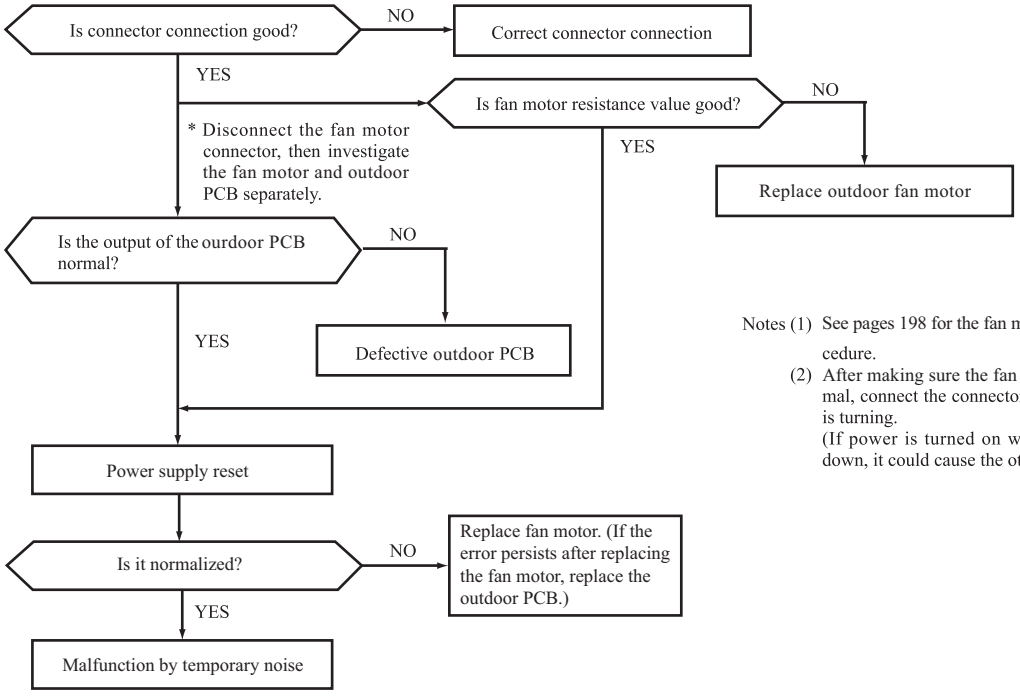
Notes (1) For inspection of electronic expansion valve, see page 198

(2) For the output voltage check of power transistor, see page 195

(3) Check coil resistance, see page 190.

Outdoor fan motor error

[Defective fan motor, connector poor connection, defective outdoor PCB]

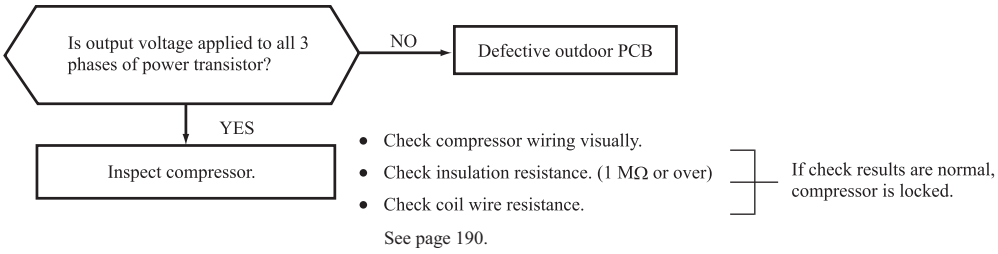

Is connector connection good?
NO
Correct connector connection
YES
Is fan motor resistance value good?
NO
YES
Replace outdoor fan motor
* Disconnect the fan motor connector, then investigate the fan motor and outdoor PCB separately.
Is the output of the ourdoor PCB normal?
NO
YES
Defective outdoor PCB
Power supply reset
Is it normalized?
NO
Replace fan motor. (If the error persists after replacing the fan motor, replace the outdoor PCB.)
YES
Malfunction by temporary noise

Notes (1) See pages 198 for the fan motor and outdoor PCB check procedure.

(2) After making sure the fan motor and outdoor PCB are normal, connect the connectors and confirm that the fan motor is turning.
(If power is turned on while one or the other is broken down, it could cause the other to break down also.)

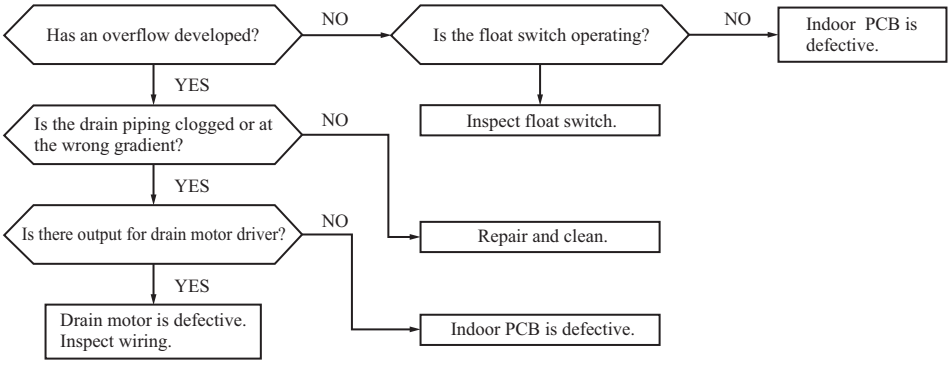
Rotor lock

[Defective compressor, defective outdoor PCB]


Is output voltage applied to all 3 phases of power transistor?
NO
Defective outdoor PCB
YES
Inspect compressor.
• Check compressor wiring visually.
• Check insulation resistance. (1 MΩ or over)
• Check coil wire resistance.
If check results are normal, compressor is locked.
See page 190.

Drain abnormality (SRR only)

[Drain piping defective,pump defect, float switch, indoor PCB]



(8) Phenomenon observed after shortcircuit, wire breakage on sensor

(a) Indoor unit

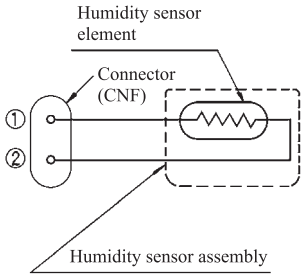
Sensor	Operation mode	Phenomenon	
		Shortcircuit	Disconnected wire
Room temperature sensor	Cooling	Release of continuous compressor operation command.	Continuous compressor operation command is not released.
	Heating	Continuous compressor operation command is not released.	Release of continuous compressor operation command.
Heat exchanger sensor	Cooling	System can be operated normally.	Continiuous compressor operation command is not released. (Anti-frosting)
	Heating	High pressure control mode (Compressor stop command)	Hot keep (Indoor fan stop)
Humidity sensor(1)	Cooling	Refer to the table below.	Refer to the table below.
	Heating	Normal system operation is possible.	

Note (1) SRK35, 50ZJ-S, 50, 60ZJX-S, SRF25, 35, 50ZJX-S only

■ Humidity sensor operation

Failure mode		Control input circuit resding	Air conditioning system operation
Disconnected wire	① Disconnected wire	Humidity reading is 0%	Anti-condensation control is not done.
	② Disconnected wire		
	①② Disconnected wire		
Short Circuit	① and ② are shot circuited	Humidity reading is 100%	Anti-condensation control keep doing.

Remark: Do not perform a continuity check of the humidity sensor with a tester. If DC current is applied, it could damage the sensor.

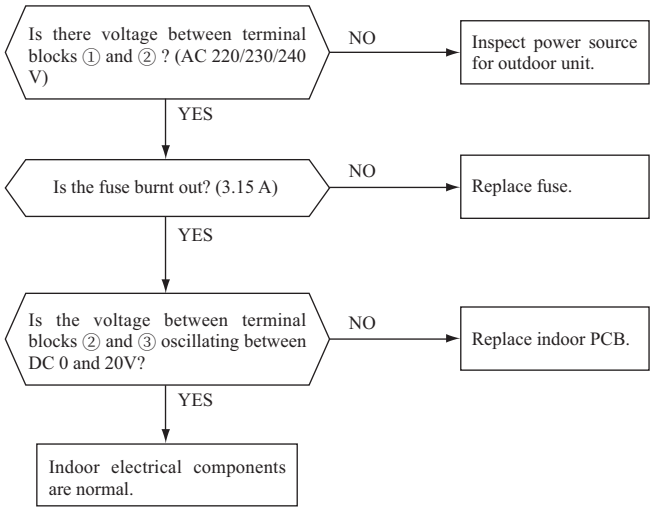


(b) Outdoor unit

Sensor	Operation mode	Phenomenon	
		Shortcircuit	Disconnected wire
Heat exchanger sensor	Cooling	System can be operated normally.	Compressor stop.
	Heating	Defrosting is not performed.	Defrosting is performed for 10 minutes at approx. 45 (models 50, 60 : 35) minutes.
Ourdoor air temperature sensor	Cooling	System can be operated normally.	Compressor stop.
	Heating	Defrosting is not operated.	Defrosting is performed for 10 minutes at approx. 45 (models 50, 60 : 35) minutes.
Discharge pipe sensor	All modes	Compressor overload protection is disabled. (Can be operated.)	Compressor stop

(9) Checking the indoor electrical equipment

(a) Indoor PCB check procedure


Is there voltage between terminal blocks ① and ② ? (AC 220/230/240 V)
NO
Inspect power source for outdoor unit.
YES
Is the fuse burnt out? (3.15 A)
NO
Replace fuse.
YES
Is the voltage between terminal blocks ② and ③ oscillating between DC 0 and 20V?
NO
Replace indoor PCB.
YES
Indoor electrical components are normal.

(b) Indoor unit fan motor check procedure

This is a diagnostic procedure for determining if the indoor unit's fan motor or the indoor PCB is broken down.

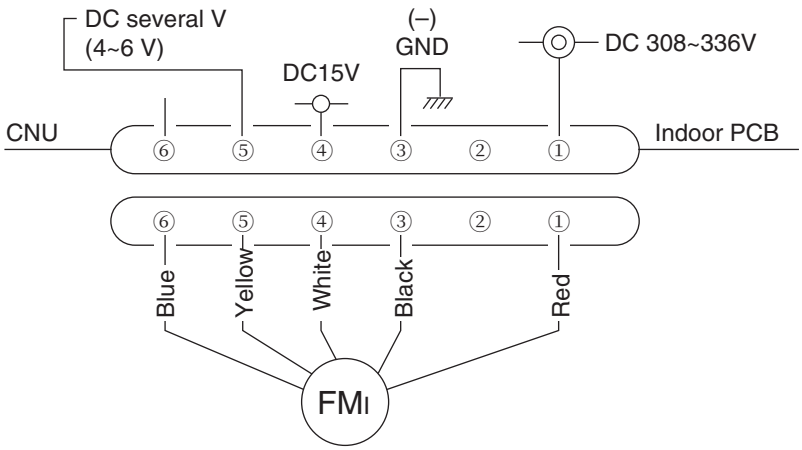
1) Indoor PCB output check

a) Turn off the power.

b) Remove the front panel, then disconnect the fan motor lead wire connector.

c) Turn on the power. If the unit operates when the ON/OFF button is pressed, if trouble is detected after the voltages in the following figure are output for approximately 30 seconds, it means that the indoor PCB is normal and the fan motor is broken down.

If the voltages in the following figure are not output at connector pins No. ①, ④ and ⑤, the indoor PCB has failed and the fan motor is normal.



Measuring point	Resistance when normal
① – ③	DC 308~336V
④ – ③	DC 15V
⑤ – ③	DC several V (4~6V)
⑥ – ③	DC several V (4~6V)

2) Fan motor resistance check

Measuring point	Resistance when normal
① – ③ (Red – Black)	20 MΩ or higher
④ – ③ (White – Black)	20 MΩ or higher

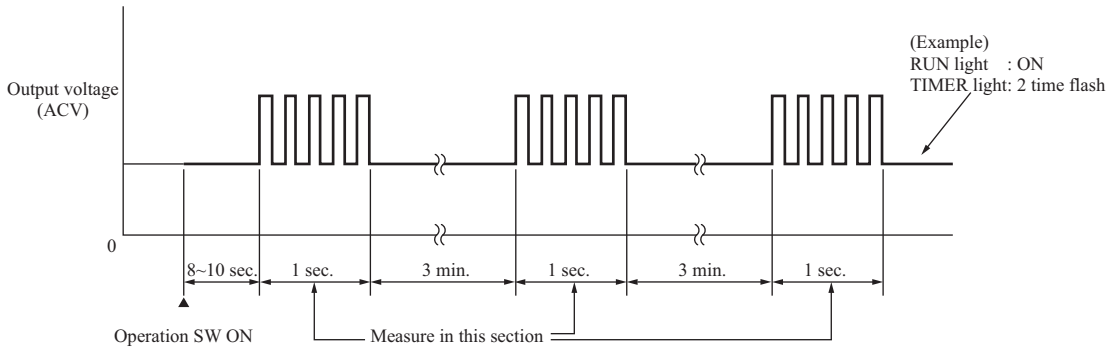
Notes (1) Remove the fan motor and measure it without power connected to it.
(2) If the measured value is below the value when the motor is normal, it means that the fan motor is faulty.

(C) Power transistor inspection procedure

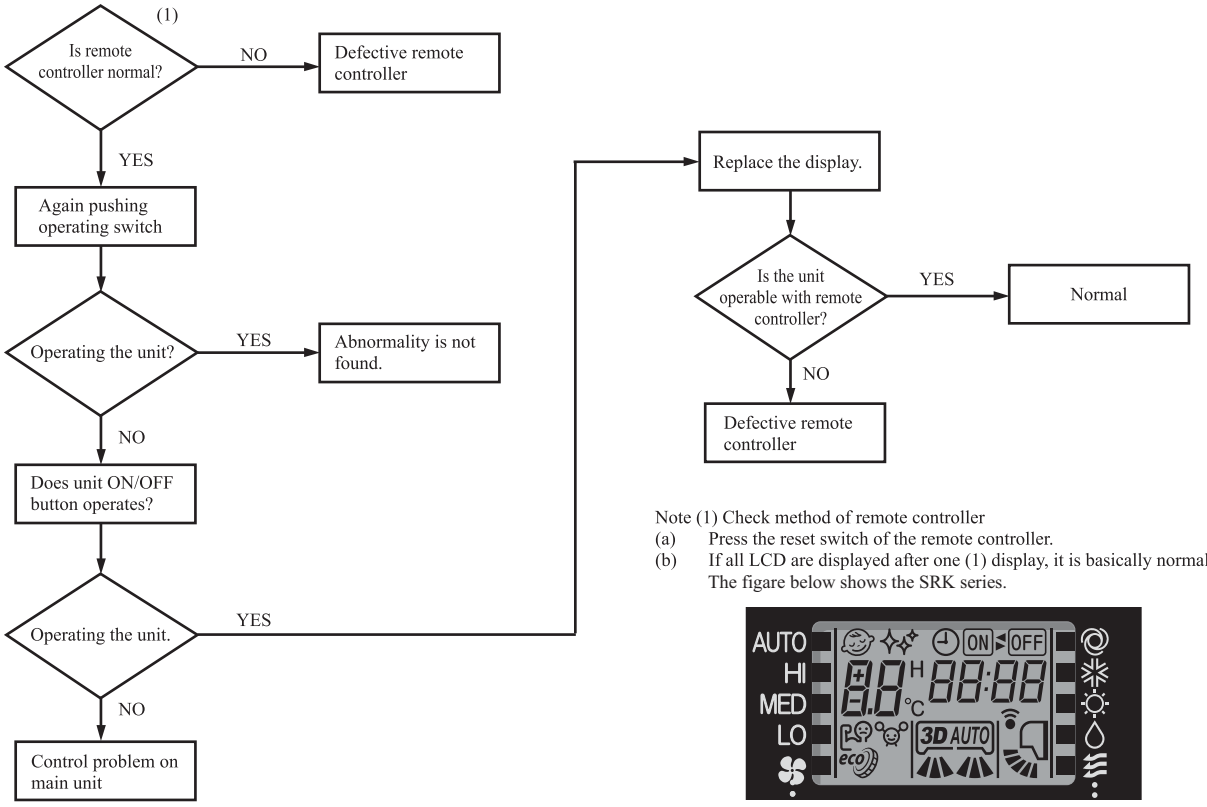
[Use a tester with a needle indicator for the inspection. (Do not use a digital tester. Check in the AC 300 volt range.)]

(1) If there is a self-diagnosis display, inspect the compressor system (burns, wiring mistakes, etc.) If no problems are found, check the output of the power transistor.

(2) Output inspection procedure
Disconnect the terminals for the compresseor.
If an output such as the one shown in the figure on the below can be measured, the power transistor and the circuit board for the outdoor unit are normal.



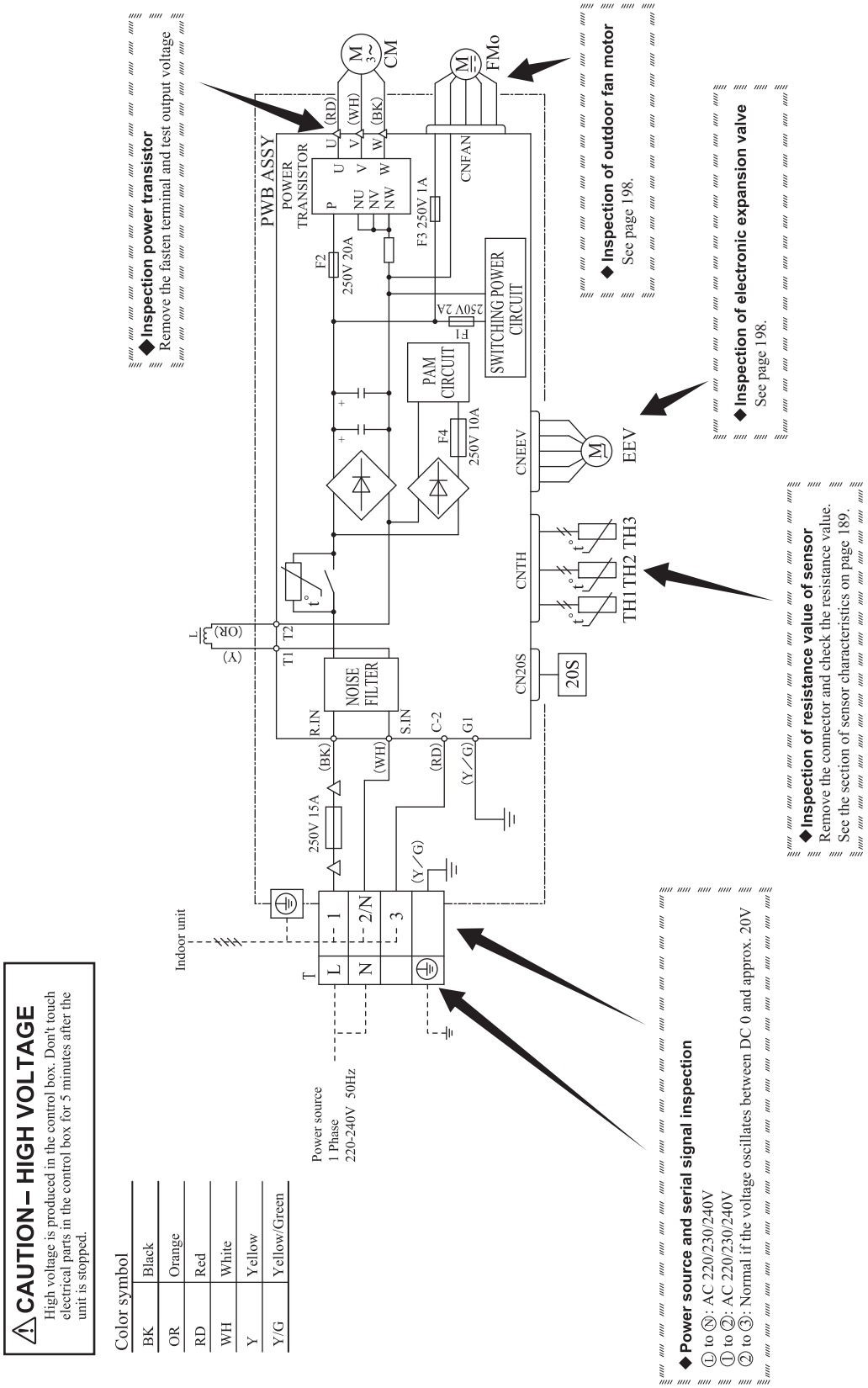
(10) How to make sure of wireless remote controller



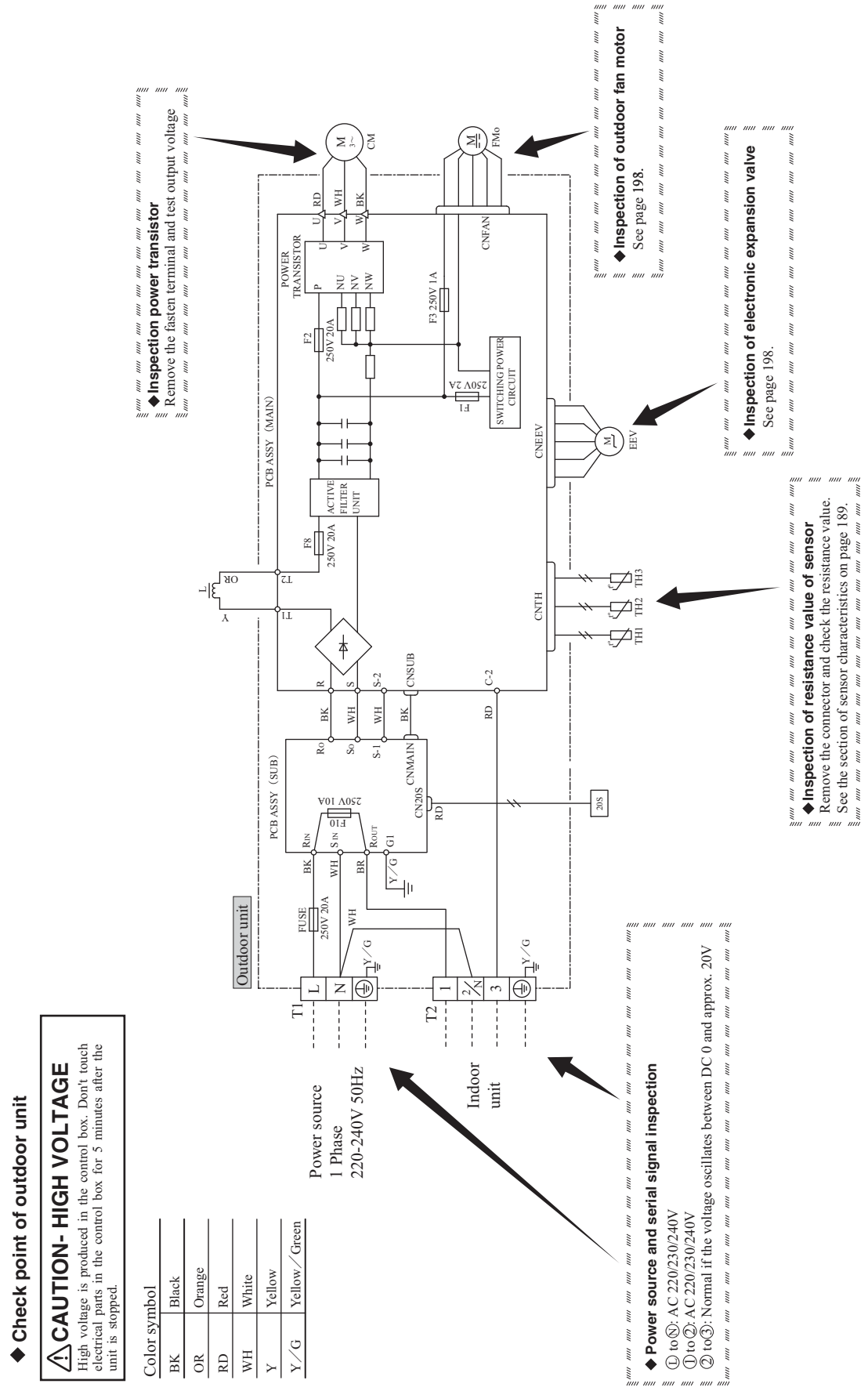
Note (1) Check method of remote controller
(a) Press the reset switch of the remote controller.
(b) If all LCD are displayed after one (1) display, it is basically normal.
The figare below shows the SRK series.

(11) Outdoor unit inspection points

Models SRC20ZJ-S,25ZJ-S,35ZJ-S
20ZJX-S, 25ZJX-S, 35ZJX-S



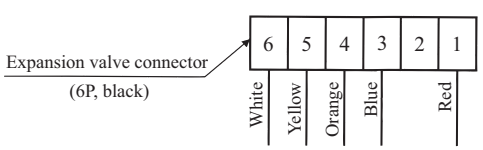
Models SRC50ZJ-S,50ZIX-S,60ZIX-S



(a) Inspection of electronic expansion valve

Electronic expansion valve operates for approx. 10 seconds after the power on, in order to determine its aperture. Check the operating sound and voltage during the period of time. (Voltage cannot be checked during operation in which only the aperture change occurs.)

1) If it is heard the sound of operating electronic expansion valve, it is almost normal.
2) If the operating sound is not heard, check the output voltage.



1 – 3
1 – 4
1 – 5
1 – 6

Approx. 5 V is detected for 10 seconds after the power on.

3) If voltage is detected, the outdoor PCB is normal.
4) If the expansion valve does not operate (no operating sound) while voltage is detected, the expansion valve is defective.

• Inspection of electronic expansion valve as a separate unit

Measure the resistance between terminals with an analog tester.

Measuring point	Resistance when normal
1 – 6	46 ± 4Ω (at 20ºC)
1 – 4	
1 – 3	
1 – 5	

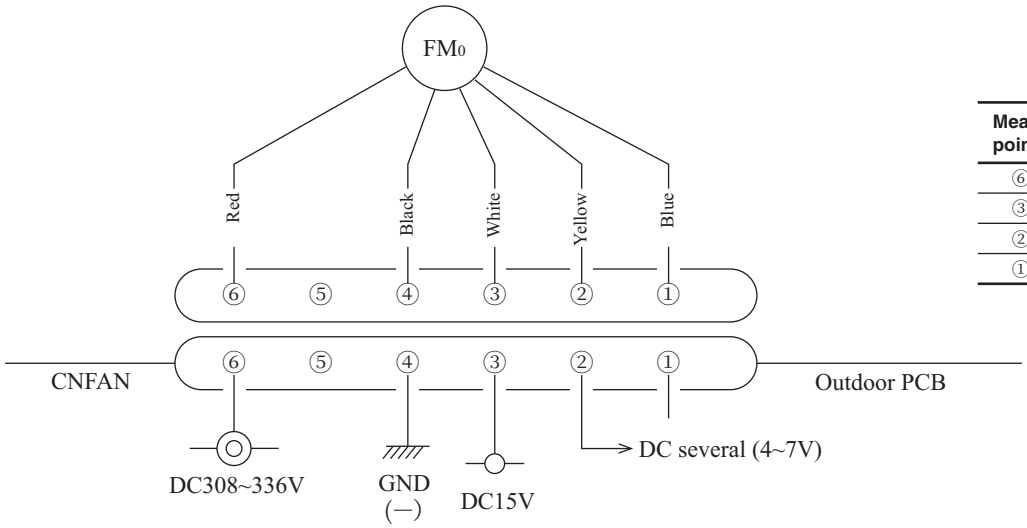
(b) Outdoor unit fan motor check procedure

• When the outdoor unit fan motor error is detected, diagnose which of the outdoor unit fan motor or outdoor PCB is defective.
• Diagnose this only after confirming that the indoor unit is normal.

(1) Outdoor PCB output check

1) Turn off the power.
2) Disconnect the outdoor unit fan motor connector CNFAN.
3) When the indoor unit is operated by inserting the power supply plug and pressing (ON) the backup switch for more than 5 seconds, if the voltage of pin No. ② in the following figure is output for 30 seconds at 20 seconds after turning "ON" the backup switch, the outdoor PCB is normal but the fan motor is defective.
If the voltage is not detected, the outdoor PCB is defective but the fan motor is normal.

Note (1) The voltage is output 3 times repeatedly. If it is not detected, the indoor unit displays the error message.



Measuring point	Resistance when normal
⑥ - ④	DC 308~336V
③ - ④	DC 15V
② - ④	DC several V (4~7V)
① - ④	DC several V (4~7V)

2) Fan motor resistance check

Measuring point	Resistance when normal
⑥ - ④ (Red - Black)	20 MΩ or higher
③ - ④ (White - Black)	20 MΩ or higher

Notes (1) Remove the fan motor and measure it without power connected to it.
(2) If the measured value is below the value when the motor is normal, it means that the fan motor is faulty.

11.2 FDTC series

11.2.1 Diagnosing of microcomputer circuit

(1) Selfdiagnosis function

(a) Check indicator table

Whether a failure exists or not on the indoor unit can be know by the contents of remote controller error code, indoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

(i) Indoor unit

Remote controller		Indoor control PCB		Location of trouble	Description of trouble	Repair method	Reference page
Error code	Red LED	Red LED	Green LED (1)				
No-indication	Stays OFF	Stays OFF	Keeps flashing	—	**• Normal operation**	—	—
		Stays OFF	Stays OFF	Indoor unit power supply	• Power OFF, broken wire/blown fuse, broken transformer wire	Repair	217
		* 3 times flash	Keeps flashing	Remote controller wires	• Poor connection, breakage of remote controller wire * For wire breaking at power ON, the LED is OFF.	Repair	218
				Remote controller	• Defective remote controller PCB	Replacement of remote controller	
WAIT or INSPECT I/U		Stays OFF	Keeps flashing	Indoor-outdoor units connection wire	• Poor connection, breakage of indoor-outdoor units connection wire	Repair	219 ～ 223
				Remote controller	• Improper setting of master and slave by remote controller		
E1	Keeps flashing	Stays OFF	* Keeps flashing	Remote controller wires (Noise)	**• Poor connection of remote controller signal wire (White)** * For wire breaking at power ON, the LED is OFF **• Intrusion of noise in remote controller wire**	Repair	224
				Remote controller indoor control PCB	*• Defective remote controller or indoor control PCB (defective communication circuit)?	Replacement of remote controller or PCB	
E5		2 times flash	Keeps flashing	Indoor-outdoor units connection wire	**• Poor connection of wire between indoor-outdoor units during operation (disconnection, loose connection)** **• Anomalous communication between indoor-outdoor units by noise, etc.**	Repair	225
		2 times flash	Keeps flashing	(Noise)	**• CPU-runaway on outdoor control PCB**	Power reset or Repair	
				Outdoor control PCB	*• Occurrence of defective outdoor control PCB on the way of power supply (defective communication circuit)?	Replacement of PCB	
		2 times flash	Keeps flashing	Outdoor control PCB	**• Defective outdoor control PCB on the way of power supply**	Replacement	
				Fuse	**• Blown fuse**		
E6		1 time flash	Keeps flashing	Indoor heat exchanger temperature thermistor	**• Defective indoor heat exchanger temperature thermistor** (defective element, broken wire, short-circuit) • Poor contact of temperature thermistor connector	Replacement, repair of temperature thermistor	226
				Indoor control PCB	***• Defective indoor control PCB (Defective temperature thermistor input circuit)?**	Replacement of PCB	
E7		1 time flash	Keeps flashing	Indoor return air temperature thermistor	**• Defective indoor return air temperature thermistor** (defective element, broken wire, short-circuit) • Poor contact of temperature thermistor connector	Replacement, repair of temperature thermistor	227
				Indoor control PCB	***• Defective indoor control PCB (Defective temperature thermistor input circuit)?**	Replacement of PCB	
E8		1 time flash	Keeps flashing	Installation or operating condition	**• Heating over-load** (Anomalously high indoor heat exchanger temperature)	Repair	228
				Indoor heat exchanger temperature thermistor	**• Defective indoor heat exchanger temperature thermistor (short-circuit)**	Replacement of temperature thermistor	
				Indoor control PCB	***• Defective indoor control PCB** (Defective temperature thermistor input circuit)?	Replacement of PCB	
E9		1 time flash	Keeps flashing	Drain trouble	**• Defective drain pump (DM), broken drain pump wire**, disconnected connector	Replacement, repair of DM	229
				Float switch	**• Anomalous float switch operation** (malfunction)	Repair	
				Indoor control PCB	***• Defective indoor control PCB** (Defective float switch input circuit) ***• Defective indoor control PCB** (Defective DM drive output circuit)?	Replacement of PCB	
				Option	**• Defective optional parts** (At optional anomalous input setting)	Repair	
E10		Stays OFF	Keeps flashing	Number of connected indoor units	**• When multi-unit control by remote controller is performed, the number of units is over**	Repair	230
E16		Stays OFF	Keeps flashing	Fan motor	**• Defective fan motor**	Replacement, repair	231
				Indoor control PCB	**• Defective indoor control PCB**	Replacement	
E19		1 time flash	Keeps flashing	Indoor control PCB	**• Improper operation mode setting**	Repair	232
E28		Stays OFF	Keeps flashing	Remote controller temperature thermistor	• Broken wire of remote controller temperature thermistor	Repair	233

Note (1) **Normal indicator lamp (Indoor unit: Green) extinguishes (or lights continuously) only when CPU is anomalous. It keeps flashing in any trouble other than anomalous CPU.**

(2) * mark in the Description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

(ii) Outdoor unit

Remote controller		Indoor control PCB		Location of trouble	Description of trouble	Repair method	Reference page
Error code	Red LED	Red LED	Green LED				
E35	Keeps flashing	Stays OFF	Keeps flashing	Installation, operation status	• Higher outdoor heat exchanger temperature	Repair	234
				Outdoor heat exchanger temperature sensor	• Defective outdoor heat exchanger temperature sensor	Replacement, repair of temperature sensor	
				Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E36		Stays OFF	Keeps flashing	Installation, operation status	• Higher discharge temperature	Repair	235
				Discharge pipe temperature sensor	• Defective discharge pipe temperature sensor	Replacement, repair of temperature sensor	
				Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E37		Stays OFF	Keeps flashing	Outdoor heat exchanger temperature sensor	• Defective outdoor heat exchanger temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	236
				Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E38		Stays OFF	Keeps flashing	Outdoor air temperature sensor	• Defective outdoor air temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	237
				Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E39		Stays OFF	Keeps flashing	Discharge pipe temperature sensor	• Defective discharge pipe temperature sensor, broken wire or poor connector connection	Replacement, repair of temperature sensor	238
				Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature sensor input circuit)?	Replacement of PCB	
E42		Stays OFF	Keeps flashing	Outdoor control PCB, compressor	• Current cut (Anomalous compressor over-current)	Replacement of PCB	239・240
				Installation, operation status	• Service valve closing operation	Repair	
E47		Stays OFF	Keeps flashing	Outdoor control PCB	• Defective active filter	Repair PCB replacement	241
E48		Stays OFF	Keeps flashing	Fan motor	• Defective fan motor	Replacement	242
				Outdoor control PCB	• Defective outdoor control PCB		
E51		Stays OFF	Keeps flashing	Power transistor error (outdoor control PCB)	• Power transistor error	Replacement of PCB	243
E57		Stays OFF	Keeps flashing	Operation status	• Shortage in refrigerant quantity	Repair	244
				Installation status	• Service valve closing operation	Service valve opening check	
E58		Stays OFF	Keeps flashing	• Overload operation • Overcharge • Compressor locking	• Current safe stop	Replacement	245
E59		Stays OFF	Keeps flashing	Compressor, outdoor control PCB	• Anomalous compressor startup	Replacement	246
E60		Stays OFF	Keeps flashing	Compressor	• Anomalous compressor rotor lock	Replacement	247

Note (1) * mark in the Description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

(iv) Display sequence of error codes or inspection indicator lamps

■ **Occurrence of one kind of error**

Displays are shown respectively according to errors.

■ **Occurrence of plural kinds of error**

Section	Category of display
Error code on remote controller	• Displays the error of higher priority (When plural errors are persisting) E1 E5 ·····E10>E35>·····Eb0
Red LED on indoor control PCB	• Displays the present errors. (When a new error has occurred after the former error was reset.)

■ **Error detecting timing**

Section	Error description	Error code	Error detecting timing
Indoor	Drain trouble (Float switch activated)	E9	Whenever float switch is activated after 30 second had past since power ON.
	Communication error at initial operation	"WAIT"	No communication between indoor and outdoor units is established at initial operation.
	Remote controller communication circuit error	E1	Communication between indoor unit and remote controller is interrupted for mote than 2 minutes continuously after initial communication was established.
	Communication error during operation	E5	Communication between indoor and outdoor units is interrupted for mote than 2 minutes continuously after initial communication was established.
	Excessive number of connected indoor units by controlling with one remote controller	E10	Whenever excessively connected indoor units is detected after power ON.
	Return air temperature thermistor anomaly	E7	-50°C or lower is detected for 5 seconds continuously within 60 minutes after initial detection of this anomalous temperature.
	Indoor heat exchanger temperature thermistor anomaly	E6	-50°C or lower is detected for 5 seconds continuously within 60 minutes after initial detection of this anomalous temperature. Or 70°C or higher is detected for 5 seconds continuously.
Outdoor	Outdoor air temperature sensor anomaly	E38	-55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous sensor. Or -55°C or higher is detected for 5 seconds continuously within 20 seconds after power ON.
	Outdoor heat exchanger temperature sensor anomaly	E37	-55°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous sensor. Or -55°C or lower is detected for 5 seconds continuously within 20 seconds after power ON.
	Discharge pipe temperature sensor anomaly	E39	-25°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous sensor.

■ **Error log and reset**

Error indicator	Memorized error log	Reset
Remote controller display	• Higher priority error is memorized.	• Stop the unit by pressing the ON/OFF switch of remote controller. • If the unit has recovered from anomaly, it can be operated.
Red LED on indoor control PCB	• Not memorized.	

■ **Resetting the error log**

• Resetting the memorized error log in the remote controller

Holding down “CHECK” button, press “TIMER” button to reset the error log memorized in the remote controller.

• Resetting the memorized error log

The remote controller transmits error log erase command to the indoor unit when “VENTI” button is pressed while holding down “CHECK” button.

Receiving the command, the indoor unit erase the log and answer the status of no error.

(2) Troubleshooting procedure

When any trouble has occurred, inspect as follows. Details of respective inspection method will be described on later pages.

Trouble → Confirmation of power supply (Indoor/ outdoor unit) → Confirmation of remote controller and LEDs on the PCB of indoor unit (Indoor, remote controller) → Check of the anomalous operation data on the remote controller → Inspection of the unit/ controller → Replacement/ repair of faulty part, test run, adjustment

(3) Troubleshooting at the indoor unit

With the troubleshooting, find out any defective part by checking the voltage (AC, DC), resistance, etc. at respective connectors at around the indoor PCB, according to the inspection display or operation status of unit (the compressor does not run, fan does not run, the 4-way valve does not switch, etc.), and replace or repair in the unit of following part.

(a) Replacement part related to indoor PCB’s

Control PCB, power supply PCB, temperature thermistor (return air, indoor heat exchanger), remote controller switch and fuse

Note (1) With regard to parts of high voltage circuits and refrigeration cycle, judge it according to ordinary inspection methods.

(b) Instruction of how to replace indoor control PCB

SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the replacement in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, WARNING and CAUTION.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
  ⚠ WARNING Wrong installation would cause serious consequences such as injuries or death.
  ⚠ CAUTION Wrong installation might cause serious consequences depending on circumstances.
- After completing the replacement, do commissioning to confirm there are no anomaly.

⚠ WARNING

- Replacement should be performed by the specialist.
  If you replace the PCB by yourself, it may lead to serious trouble such as electric shock or fire.
- Replace the PCB correctly according to these instructions.
  Improper replacement may cause electric shock or fire.
- Shut off the power before electrical wiring work.
  Replacement during the applying the current would cause the electric shock, unit failure or improper running.
  It would cause the damage of connected equipment such as fan motor,etc.
- Fasten the wiring to the terminal securely, and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connections or hold could result in abnormal heat generation or fire.
- Check the connection of wiring to PCB correctly before turning on the power, after replacement.
  Defectiveness of replacement may cause electric shock or fire.

⚠ CAUTION

- In connecting connector onto the PCB, connect not to deform the PCB. It may cause breakage or malfunction.
- Insert connecter securely, and hook stopper. It may cause fire or improper running.
- Bundle the cables together so as not to be pinched or be tensioned. It may cause malfunction or electric shock for disconnection or deformation.

• Control PCB

PSB012D931F

Replace and set up the PCB according to this instruction.

① Set to an appropriate address and function using switch on PCB.

Select the same setting with the removed PCB.

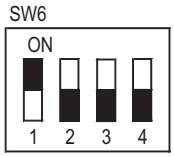
item	switch	Content of control	
Address	SW2	Plural indoor units control by 1 remote controller	
Test run	SW7-1	—	Normal
		○	Operation check/drain motor test run

○:ON —:OFF

② Set to an appropriate capacity using the model selector switch(SW6).

Select the same capacity with the PCB removed from the unit.

SW6	-1	-2	-3	-4
25VD	○	—	—	—
35VD	—	○	—	—



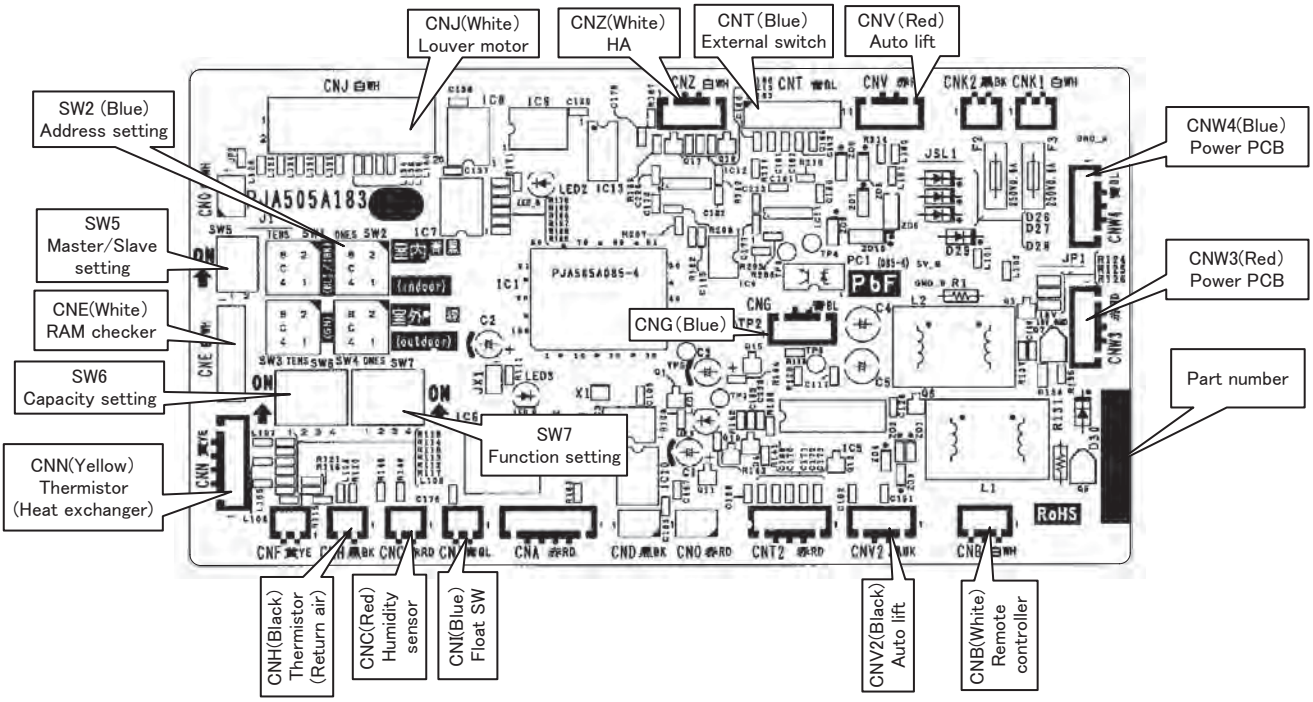
Example setting fro 25VD

③ Replace the PCB

1. Fix the PCB so as not to pitch the cords.
2. Connect connectors to the PCB. Connect a cable connector with the PCB connector of the same color.
3. Do not pass CPU surrounding about wirings.

④ Control PCB

Parts mounting are different by the kind of PCB.



• Power PCB

PSB012D953A

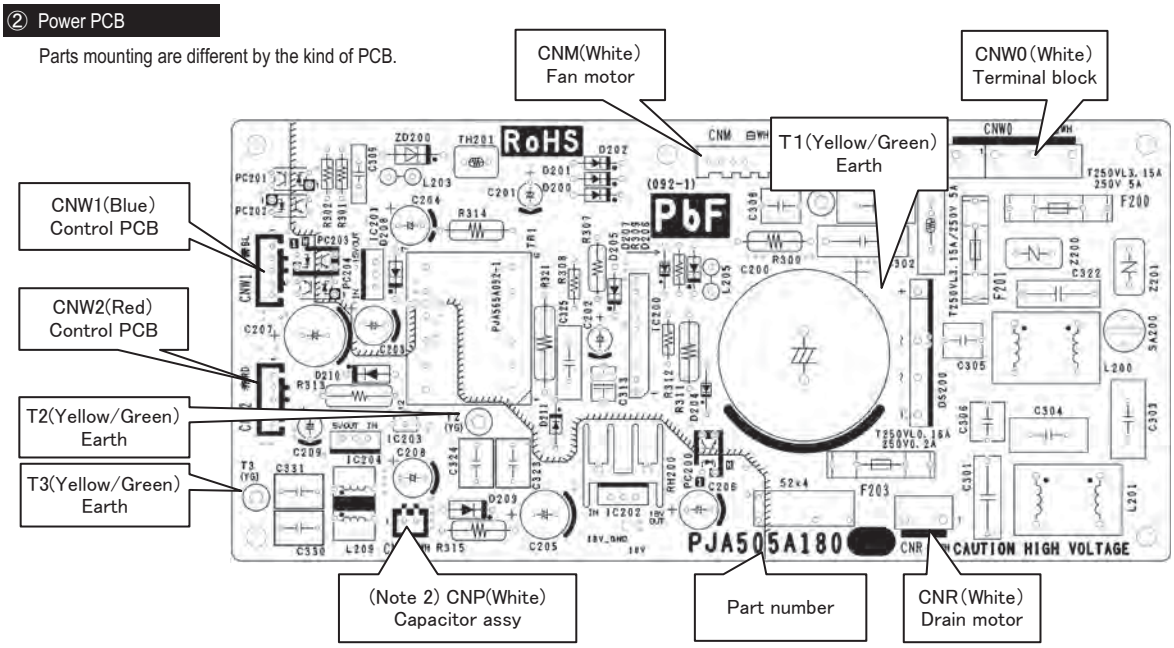
This PCB is a general PCB. Replace the PCB according to this instruction.

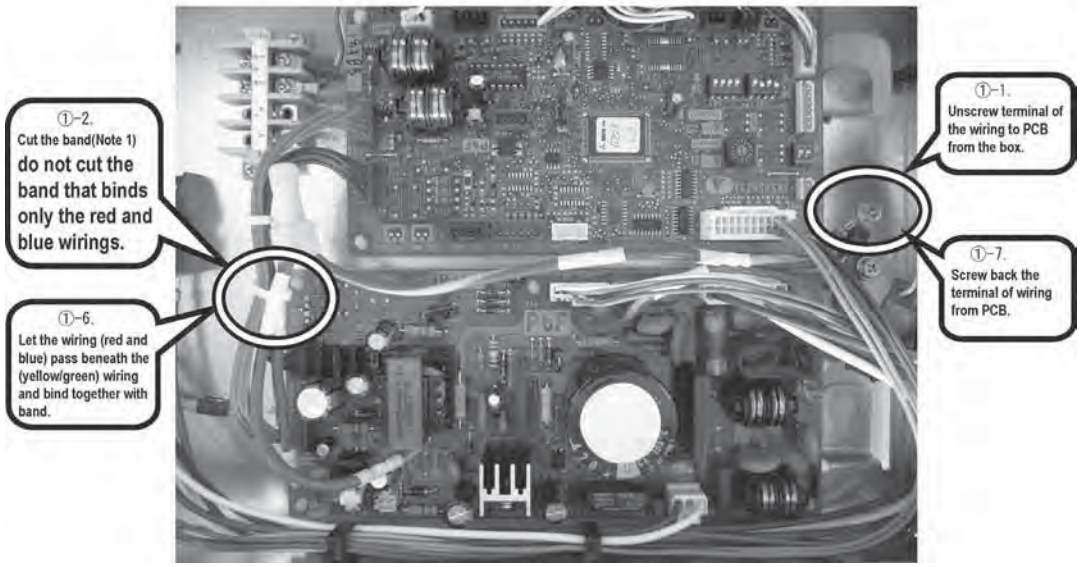
① Replace the PCB (refer to right dwg.)

1. Unscrew terminal of the wiring(yellow/green) soldered to PCB from the box.
2. Cut the band that binds the wiring (red and blue) from connector CNW1 and CNW2, and the wiring (yellow/green) from PCB (T2/T3) . (Note 1)
   (However, do not cut the band that binds only the red and blue wirings.)
3. Replace the PCB only after all the wirings connected to the connector are removed.
4. Fix the board such that it will not pinch any of the wires.
5. Reconnect the wirings to the PCB. Wiring connector color should match with the color of connector of the PCB. (Note 2)
6. Let the wiring (red and blue) pass beneath the (yellow/green) wiring and bind together with band.
7. Screw back the terminal of wiring (yellow/green) from PCB(T1, T2/T3), that was removed in 1.
   In that case, do not place the crimping part of the wiring under the PCB.
   (Note 1): It might not be applicable on some models.
   (Note 2): After replacing PCB, connection between capacitor assy and connector CNP is **no longer needed.**

② Power PCB

Parts mounting are different by the kind of PCB.




①-2.
Cut the band(Note 1)
do not cut the band that binds only the red and blue wirings.
①-6.
Let the wiring (red and blue) pass beneath the (yellow/green) wiring and bind together with band.
①-1.
Unscrew terminal of the wiring to PCB from the box.
①-7.
Screw back the terminal of wiring from PCB.

●DIP switch setting list

Switches	Description		Default setting		Remarks
SW2	Address No. setting at plural indoor units control by 1 R/C		0		0-F
SW6-1	Model selection		As per model		See table 1
SW6-2					
SW6-3					
SW6-4					
SW7-1	Test run, Drain motor	Normal*/Test run	OFF	Normal	
SW7-2	Reserved		OFF		keep OFF
SW7-3	Powerful mode	Valid*/Invalid	ON	Valid	
SW7-4	Reserved		OFF		keep OFF
JSL1	Superlink terminal spare	Normal*/switch to spare	With		

* Default setting

Table 1: Indoor unit model selection with SW6-1-SW6-4

0: OFF 1:ON

	25VD	35VD
SW6-1	1	0
SW6-2	0	1
SW6-3	0	0
SW6-4	0	0

(4) Check of anomalous operation data with the remote controller

Operation data can be checked with remote control unit operation.

① Press the CHECK button.
The display change " OPER DATA ▼"

② Press the ○ (SET) button while " OPER DATA ▼" is displayed.

③ When only one indoor unit is connected to remote controller, " DATA LOADING " is displayed (blinking indication during data loading).
Next, operation data of the indoor unit will be displayed. Skip to step ⑦.

④ When plural indoor units is connected, the smallest address number of indoor unit among all connected indoor unit is displayed.
[Example]:
" SELECT I/U " (blinking 1 seconds) → " I/U000 ▲ " blinking.

⑤ Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.

⑥ Determine the indoor unit number with the ○ (SET) button.
(The indoor unit number changes from blinking indication to continuous indication)
" I/U000 " (The address of selected indoor unit is blinking for 2 seconds.)
↓
" DATA LOADING " (A blinking indication appears while data loaded.)
Next, the operation data of the indoor unit is indicated.

⑦ Upon operation of the ▲ ▼ button, the current operation data is displayed in order from data number 01.
The items displayed are in the above table.
*Depending on models, the items that do not have corresponding data are not displayed.

Number	Data Item	
01	✻	(Operation Mode)
02	SET TEMP___℃	(Set Temperature)
03	RETURN AIR___℃	(Return Air Temperature)
04	SENSOR___℃	(Remote Controller Thermistor Tempeature)
05	THI-R1___℃	(Indoor Heat Exchanger Thermistor / U Bend)
06	THI-R2___℃	(Indoor Heat Exchanger Thermistor /Capillary)
07	THI-R3___℃	(Indoor Heat Exchanger Thermistor /Gas Header)
08	I/U FANSPEED___	(Indoor Unit Fan Speed)
09	DEMAND___Hz	(Frequency Requirements)
10	ANSWER___Hz	(Response Frequency)
11	I/U EEV____P	(Pulse of Indoor Unit Expansion Value)
12	TOTAL I/U RUN____H	(Total Running Hours of The Indoor Unit)
21	OUTDOOR___℃	(Outdoor Air Temperature)
22	THO-R1___℃	(Outdoor Heat Exchanger Thermistor)
23	THO-R2___℃	(Outdoor Heat Exchanger Thermistor)
24	COMP___Hz	(Compressor Frequency)
25	HP____MPa	(High Pressure)
26	LP____MPa	(Low Pressure)
27	Td___℃	(Discharge Pipe Temperature)
28	COMP BOTTOM___℃	(Comp Bottom Temperature)
29	CT___AMP	(Current)
30	TARGET SH___℃	(Target Super Heat)
31	SH___℃	(Super Heat)
32	TDSH___℃	(Discharge Pipe Super Heat)
33	PROTECTION No.__	(Protection State No. of The Compressor)
34	O/U FANSPEED___	(Outdoor Unit Fan Speed)
35	63H1	(63H1 On/Off)
36	DEFROST	(Defrost Control On/Off)
37	TOTAL COMP RUN___H	(Total Running Hours of The Compressor)
38	O/U EEV1____P	(Pulse of The Outdoor Unit Expansion Valve EEVC)
39	O/U EEV2____P	(Pulse of The Outdoor Unit Expansion Valve EEVH)

⑧ To display the data of a different indoor unit, press the AIR CON NO. button, which allows you to go back to the indoor unit selection screen.

⑨ Pressing the ①ON/OFF button will stop displaying data.
Pressing the ⁄ (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.
⊙If two (2) remote controllers are connected to one (1) inside unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

(5) Inverter checker for diagnosis of inverter output

●Checking method

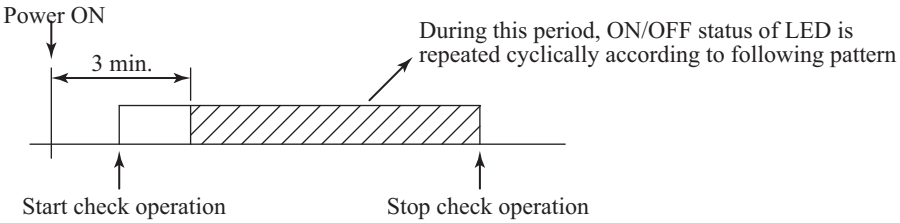
(a) Setup procedure of checker.

1) Power OFF (Turn off the breaker).
2) Remove the terminal cover of compressor and disconnect the wires (U, V, W) from compressor.
3) Connect the wires U (Red) , V (White) and W (Black) of the checker to the terminal of disconnected wires (U, V, W) from compressor respectively.

(b) Operation for judgment.

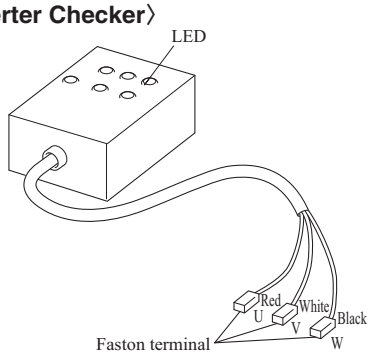
1) Power ON and start check operation on cooling or heating mode.
2) Check ON/OFF status of 6 LED's on the checker.
3) Judge the PCB by ON/OFF status of 6 LED's on the checker.

ON/OFF status of LED	If all of LED are ON/OFF according to following pattern	If all of LED stay OFF or some of LED are ON/OFF
Outdoor PCB	Normal	Anomalous


Power ON
3 min.
During this period, ON/OFF status of LED is repeated cyclically according to following pattern
Start check operation
Stop check operation

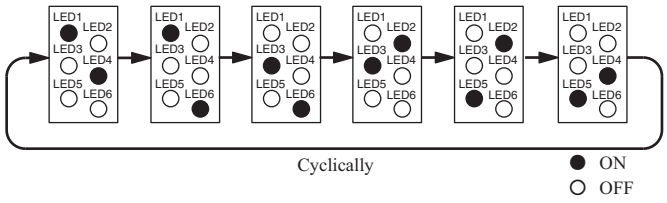
4) Stop check operation within about 2minutes after starting check operation.

〈**Inverter Checker**〉

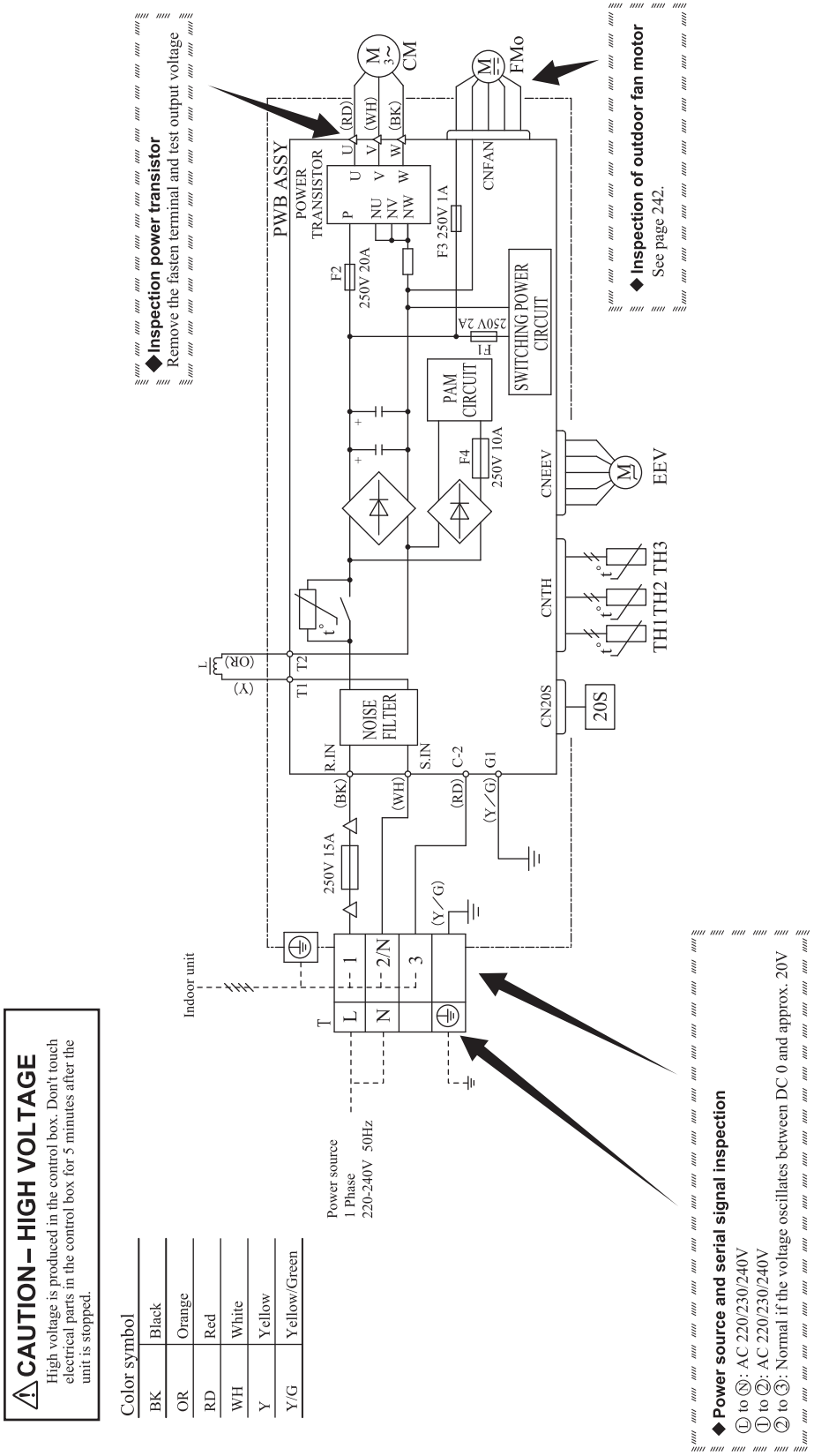


Connect to the terminal of the wires which are disconnected from compressor.

LED ON/OFF pattern



(6) Outdoor unit controller failure diagnosis circuit diagram



11.2.2 Troubleshooting flow

(1) List of troubles

No.	Remote controller display	Description of trouble	Reference page
1	None	Operates but does not cool.	210
2	None	Operates but does not heat.	211
3	None	Earth leakage breaker activated	212
4	None	Excessive noise/vibration (1/3)	213
5	None	Excessive noise/vibration (2/3)	214
6	None	Excessive noise/vibration (3/3)	215
7	None	Louver motor failure	216
8	None	Power supply system error (Power supply to indoor control PCB)	217
9	None	Power supply system error (Power supply to remote controller)	218
10	INSPECT I/U	INSPECT I/U (When 1 or 2 remote controllers are connected)	219
11	INSPECT I/U	INSPECT I/U (Connection of 3 units or more remote controllers)	220
12	WAIT	Communication error at initial operation	221~223
13	E1	Remote controller communication circuit error	224
14	E5	Communication error during operation	225
15	E6	Indoor heat exchanger temperature thermistor anomaly	226
16	E7	Return air temperature thermistor anomaly	227
17	E8	Heating overload operation	228
18	E9	Drain trouble	229
19	E10	Excessive number of connected indoor units (more than 17 units) by controlling with one remote controller	230
20	E16	Indoor fan motor anomaly	231
21	E19	Indoor unit operation check, drain motor check setting error	232
22	E28	Remote controller temperature thermistor anomaly	233
23	E35	Cooling overload operation	234
24	E36	Discharge pipe temperature error	235
25	E37	Outdoor heat exchanger temperature sensor anomaly	236
26	E38	Outdoor air temperature sensor anomaly	237
27	E39	Discharge pipe temperature sensor anomaly	238
28	E42	Current cut	239, 240
29	E47	Active filter voltage error	241
30	E48	Outdoor fan motor anomaly	242
31	E51	Power transistor anomaly	243
32	E57	Insufficient refrigerant amount or detection of service valve closure	244
33	E58	Current safe stop	245
34	E59	Compressor startup failure	246
35	E60	Anomalous compressor rotor lock	247

(2) Troubleshooting

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	Keeps flashing	Stays OFF	Operates but does not cool

1. Applicable model

All models

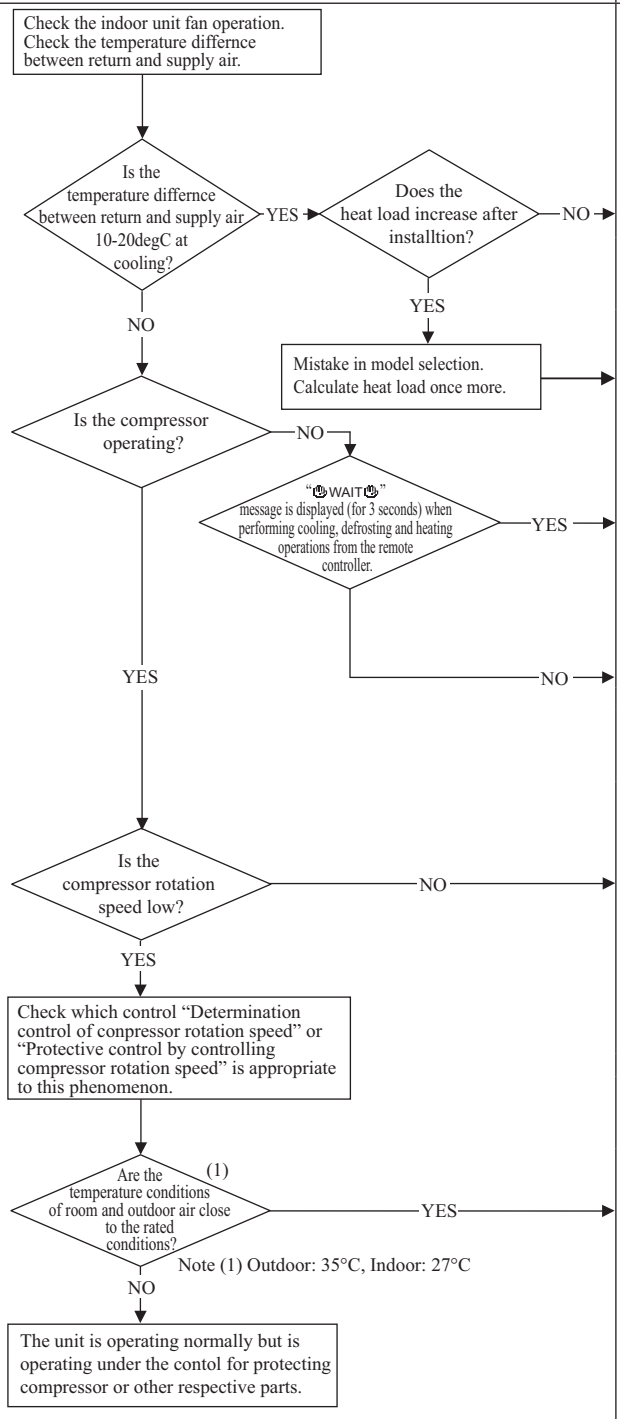
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Poor compression of compressor
- Faulty expansion valve operation

5. Troubleshooting


Diagnosis
Countermeasure
Check the indoor unit fan operation. Check the temperature differnce between return and supply air.
Is the temperature differnce between return and supply air 10-20degC at cooling?
YES
Does the heat load increase after installtion?
NO
It is normal. (This unit is designed to start in the soft start mode by detecting the under dome temperature of compressor when it restart after power reset.
YES
NO
Mistake in model selection. Calculate heat load once more.
It is necessary to replace to higher capacity one or to install additional unit.
Is the compressor operating?
NO
"WAIT" message is displayed (for 3 seconds) when performing cooling, defrosting and heating operations from the remote controller.
YES
Compressor refrigerant oil protection control at starting is activated.
NO
YES
Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputor control functions.
Is the compressor rotation speed low?
NO
Inspect the followings.
• Minor clogging of filter
• Minor clogging of heat exchanger
• Minor short-circuit
• Minor shortage of refrigerant amount
• Poor compression of compressor
YES
Check which control "Determination control of conpressor rotation speed" or "Protective control by controlling compressor rotation speed" is appropriate to this phenomenon.
Considering appropriate operation control, check suspicious points.
Inspect the followings for reference.
• Major clogging of filter
• Major clogging of heat exchanger
• Major short-circuit
• Major shortage of refrigerant amount
• Compressor protection ON
• Indoor fan tap
Are the temperature conditions of room and outdoor air close to the rated conditions? (1)
YES
Note (1) Outdoor: 35°C, Indoor: 27°C
NO
The unit is operating normally but is operating under the contol for protecting compressor or other respective parts.

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	Keeps flashing	Stays OFF	Operates but does not heat

1. Applicable model

All models

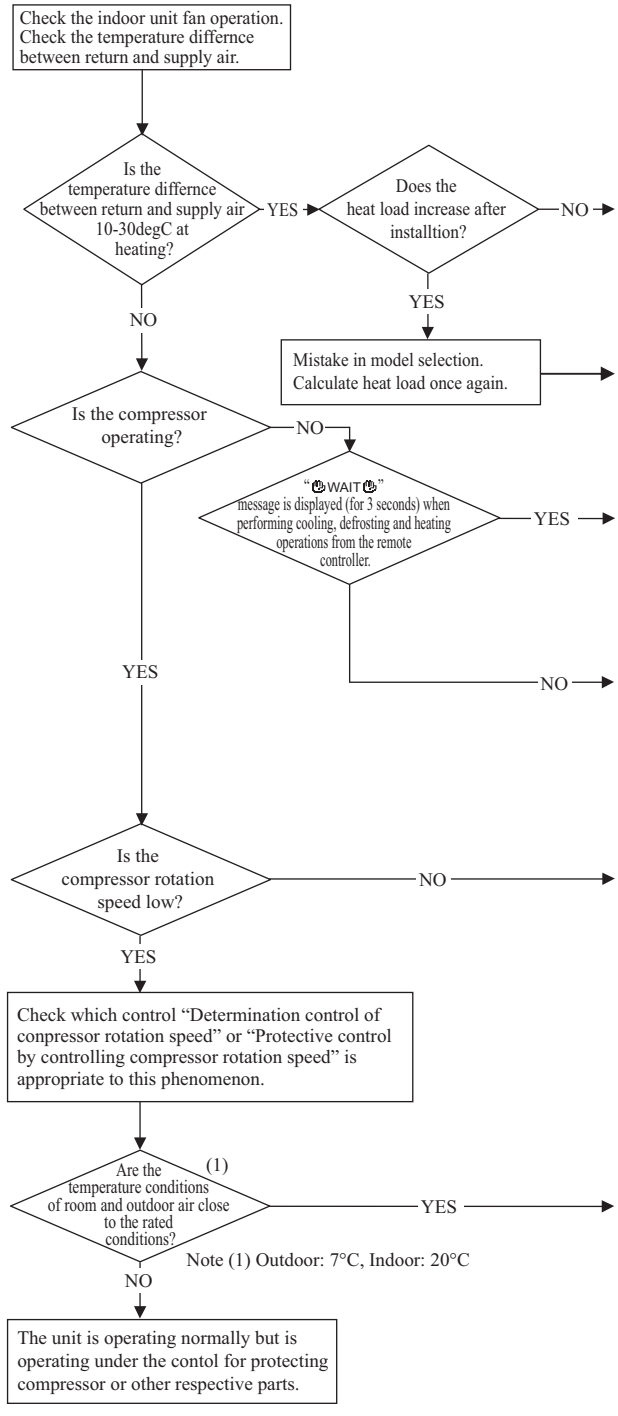
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Faulty 4-way valve operation
- Poor compression of compressor
- Faulty expansion valve operation

5. Troubleshooting

Diagnosis	Countermeasure
	It is normal. (This unit is designed to start in the soft start mode by detecting the under dome temperature of compressor when it restart after power reset. It is necessary to replace to higher capacity one or to install additional unit. Compressor refrigerant oil protection control at starting is activated. Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputor control functions. Inspect the followings. • Minor clogging of filter • Minor clogging of heat exchanger • Minor short-circuit • Minor shortage of refrigerant amount • Poor compression of compressor Considering appropriate operation control, check suspicious points. Inspect the followings for reference. • Major clogging of filter • Major clogging of heat exchanger • Major short-circuit • Major shortage of refrigerant amount • Compressor protection ON • Indoor fan tap

Check the indoor unit fan operation. Check the temperature differnce between return and supply air.
Is the temperature differnce between return and supply air 10-30degC at heating?
YES
Does the heat load increase after installtion?
NO
YES
NO
Mistake in model selection. Calculate heat load once again.
Is the compressor operating?
NO
"WAIT" message is displayed (for 3 seconds) when performing cooling, defrosting and heating operations from the remote controller.
YES
NO
YES
Is the compressor rotation speed low?
NO
YES
Check which control "Determination control of conpressor rotation speed" or "Protective control by controlling compressor rotation speed" is appropriate to this phenomenon.
Are the temperature conditions of room and outdoor air close to the rated conditions?
(1)
YES
Note (1) Outdoor: 7°C, Indoor: 20°C
NO
The unit is operating normally but is operating under the contol for protecting compressor or other respective parts.

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	Stays OFF	Stays OFF	Earth leakage breaker activated

1.Applicable model

All models

2.Error detection method

3. Condition of Error displayed

4.Presumable cause

• Defective compressor
• Noise

5.Troubleshooting

Diagnosis	Countermeasure
Are OK the insulation resistance and coil resistance of compressor? — NO	Replace compressor.*
YES → Is insulation of respective harnesses OK? Is any harness bitten between pannel and casing or etc? — NO	Secure insulation resistance.
YES → Check the outdoor unit grounding wire/earth leakage breaker.	

Check of the outdoor unit grounding wire/earth leakage breaker

① Run an independent grounding wire from the grounding screw of outdoor unit to the grounding terminal on the distribution panel. (Do not connect to another grounding wire.)
② In order to prevent malfunction of the earth leakage breaker itself, confirm that it is conformed to higher harmonic regulation.

* Insulation resistance of compressor
• Immediately after installation or when the unit has been left for long time without power supply, the insulation resistance may drop to a few MΩ because of refrigerant migrated in the compressor.
When the earth breaker is activated at lower insulation resistance, check the following points.
① 6 hours after power ON, check if the insulation resistance recovers to normal.
When power ON, crankcase heater heat up compressor and evaporate the refrigerant migrated in the compressor.
② Check if the earth leakage breaker is conformed to higher harmonic regulation or not.
Since the unit is equipped with inverter, it is necessary to use components conformed to higher harmonic regulation in order to prevent malfunction of earth leakage breaker.

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	–	–	Excessive noise/vibration (1/3)

1.Applicable model

All models

2.Error detection method

3. Condition of Error displayed

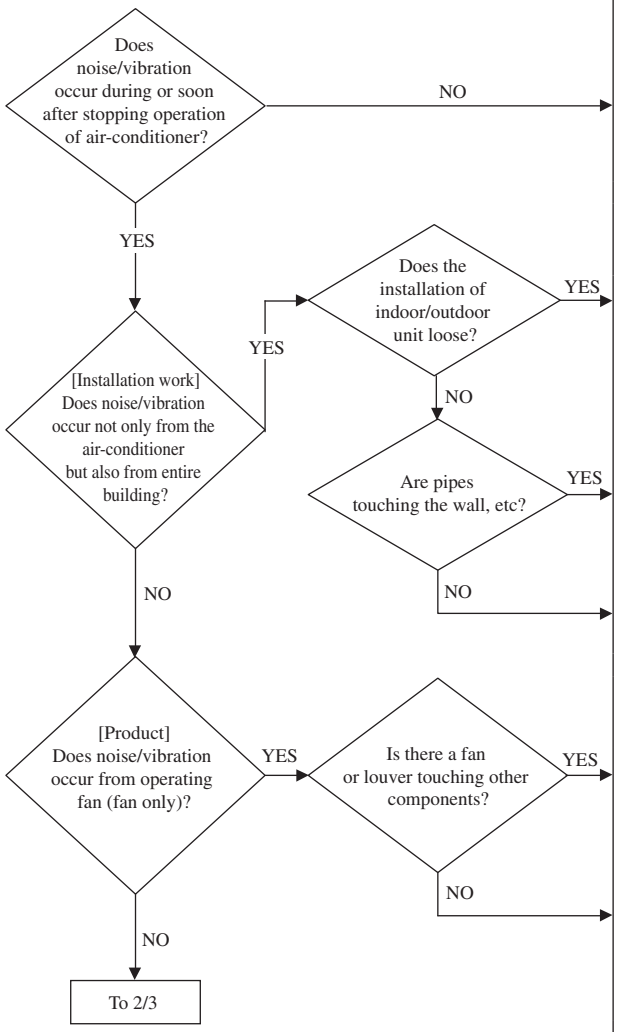
4.Presumable cause

① Improper installation work
- Improper anti-vibration work at instllation
- Insufficient strength of mounting face

② Defective product
- Before/after shipping from factory

③ Improper adjustment during commissioning
- Excess/shortage of refrigerant, etc.

5.Troubleshooting

Diagnosis	Countermeasure
	If excessive noise/vibration persists when sufficient time has elapsed after stopping the unit, it is considered that the air-conditioner is not the source. Check the installed condition carefully, and correct the position or insert rubber cushions or others into the gap, if necessary. Prevent the vibration from transmitting to wall and etc by fixing pipes on the wall or wrapping rubber cushion around the pipe which goes through the hole in the wall or applying other appropriate means. Strength of ceiling wall, floor, etc. may be insufficient. Review the installing position or reinforce it. Check for leaning of installed unit or anomalous mounting of fan, louver or motor and specify the contacting point and correct it. When the heat exchanger or filter is clogged, clean them. In case that the unit is installed at the site where background noise is very low, small noise from indoor unit can be heard, but it is normal. Before installation, check for background noise. If backgound nois is very low, convince client prior to installation.

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	–	–	Excessive noise/vibration (2/3)

1.Applicable model

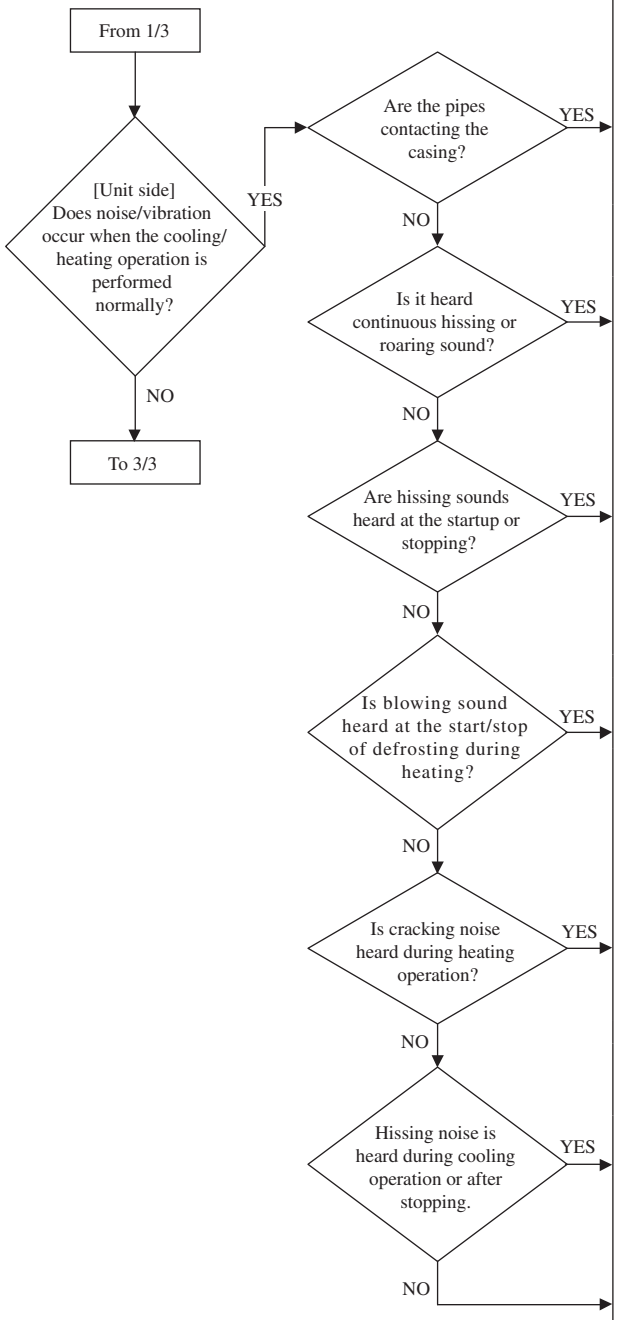
All models

2.Error detection method

3. Condition of Error displayed

4.Presumable cause

5.Troubleshooting



Diagnosis	Countermeasure
Are the pipes contacting the casing? YES	Rearrange the piping to avoid contact with the casing.
Is it heard continuous hissing or roaring sound? YES	It is noise/vibration that is generated when the refrigerant gas or liquid flow through inside of piping of air-conditioner. It is likely to occur particularly during cooling or defrosting in the heating mode. It is normal.
Are hissing sounds heard at the startup or stopping? YES	The noise/vibration occurs when the refrigerant starts or stops flowing. It is normal.
Is blowing sound heard at the start/stop of defrosting during heating? YES	When the defrosting starts or stops during heating, the refrigerant flow is reversed due to switching 4-way valve. This causes a large change in pressure which produces a blowing sound. It may accompany also the hissing sounds as mentioned above. They are normal.
Is cracking noise heard during heating operation? YES	After the start or stop of heating operation or during defrosting, abrupt changes in temperature cause resin parts to shrink or expand. This is normal.
Hissing noise is heard during cooling operation or after stopping. YES	It is the sound produced by the drain pump that discharges drain from the indoor unit. The pump continues to run for 5 minutes after stopping the cooling operation. This is normal.
NO	Apply the damper sealant at places considered to be the sources such as the pressure reducing mechanism (expansion valve), capillary, etc.

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	–	–	Excessive noise/vibration (3/3)

1.Applicable model

All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

5. Troubleshooting

Diagnosis	Countermeasure
From 2/3 Adjustment during commissioning Does noise/vibration occur when the cooling/heating operation is in anomalous condition?	If insufficient cooling/ heating problem happens due to anomalous operating conditions at cooling/ heating, followings are suspicious. • Overcharge of refrigerant • Insufficient charge of refrigerant • Intrusion of air, nitrogen, etc. In such occasion, it is necessary to recover refrigerant, vacuum-dry and recharge refrigerant. * Since there could be many causes of noise/ vibration, the above do not cover all. In such case, check the conditions when, where, how the noise/vibration occurs according to following check point. • Indoor/outdoor unit • Cooling/heating/fan mode • Startup/stop/during operation • Operating condition (Indoor/outdoor temperatures, pressure) • Time it occurred • Operation data retained by the remote controller such as compressor rotation speed, heat exchanger temperature, EEV opening degree, etc. • Tone (If available, record the noise) • Any other anomalies

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	Keeps flashing	Stays OFF	Louver motor failure

1.Applicable model

All models

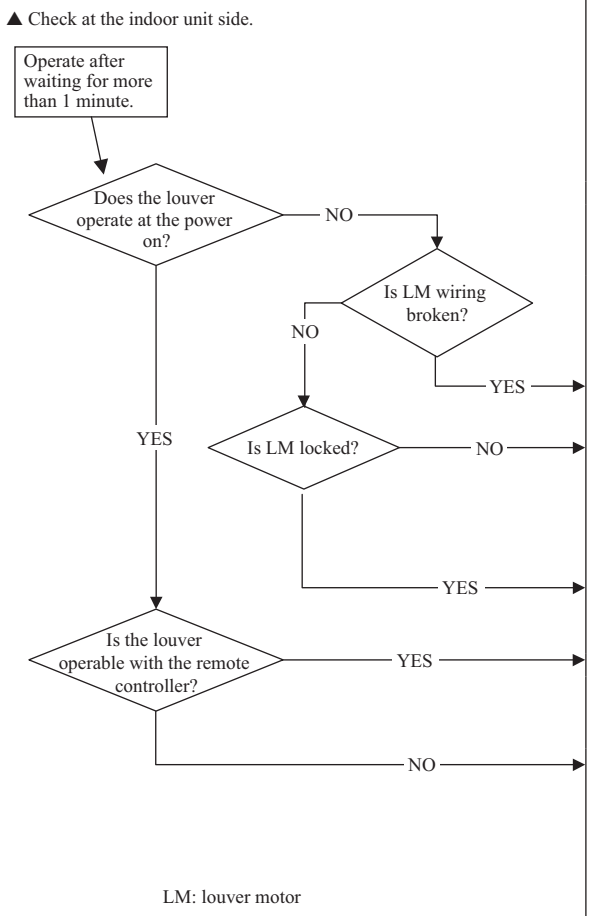
2.Error detection method

3. Condition of Error displayed

4.Presumable cause

- Defective LM
- LM wire breakage
- Faulty indoor control PCB

5.Troubleshooting



LM: louver motor

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	Stays OFF	Stays OFF	Power supply system error (Power supply to indoor control PCB)

1. Applicable model

All models

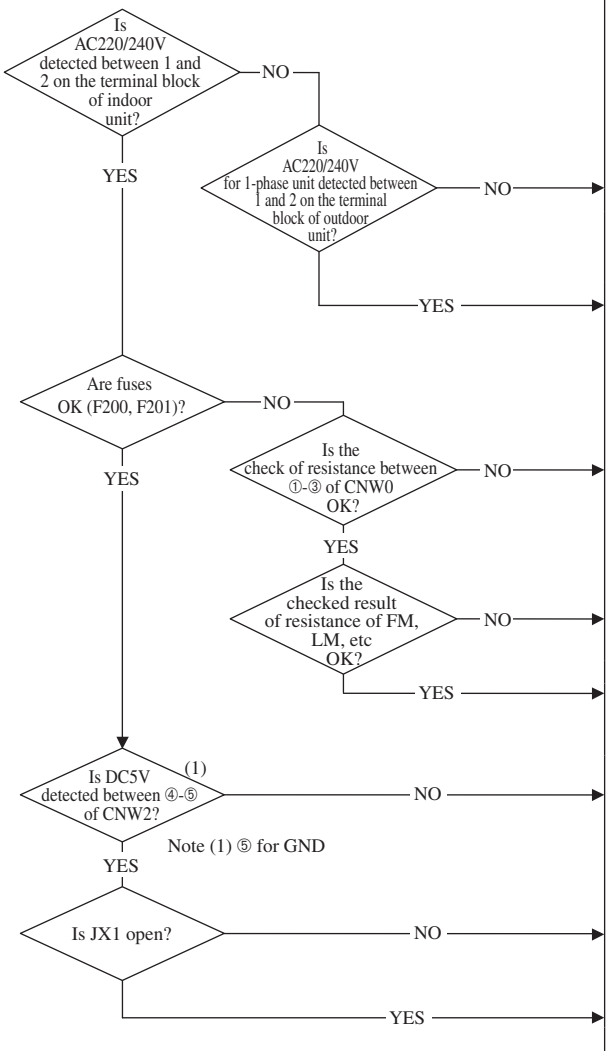
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Misconnection or breakage of connecting wires
- Blown fuse
- Faulty indoor control or power PCB
- Broken harness
- Faulty outdoor control PCB (Noise filter)

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	Keeps flashing	Stays OFF	Power supply system error (Power supply to remote controller)

1. Applicable model

All models

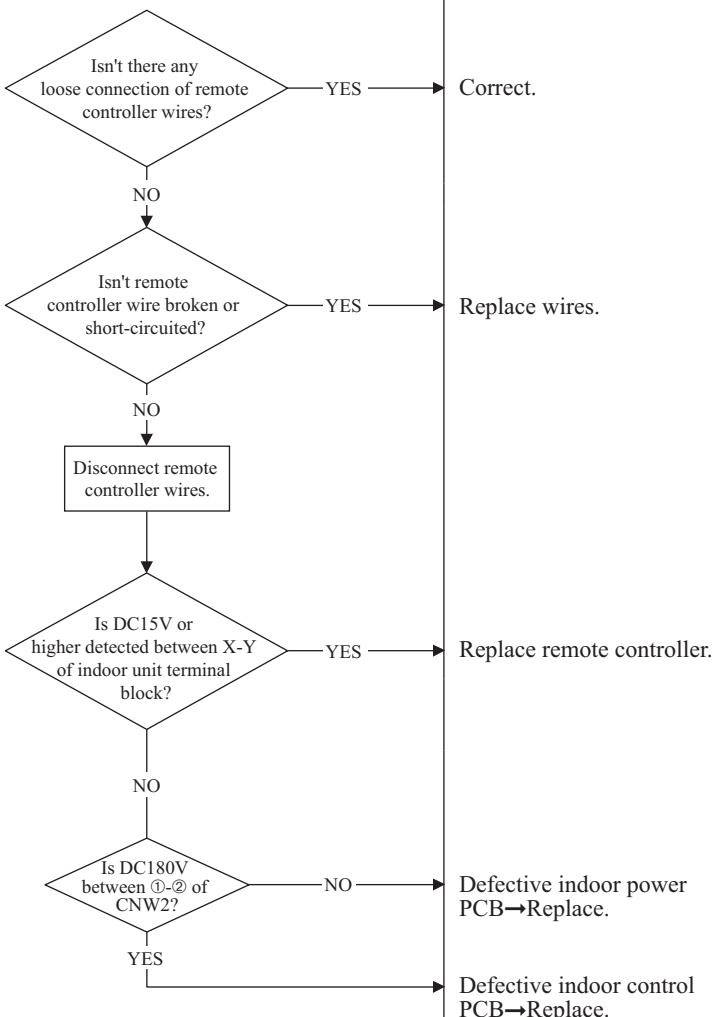
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Remote controller wire breakage/short-circuit
- Defective remote controller
- Malfunction by noise
- Faulty indoor power PCB
- Broken harness
- Faulty indoor control PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: INSPECT I/U	Indoor	Keeps flashing	Stays OFF	INSPECT I/U (When 1 or 2 remote controllers are connected)

1. Applicable model

All models

2. Error detection method

Communication between indoor unit and remote controller is disabled for more than 30 minutes after the power on.

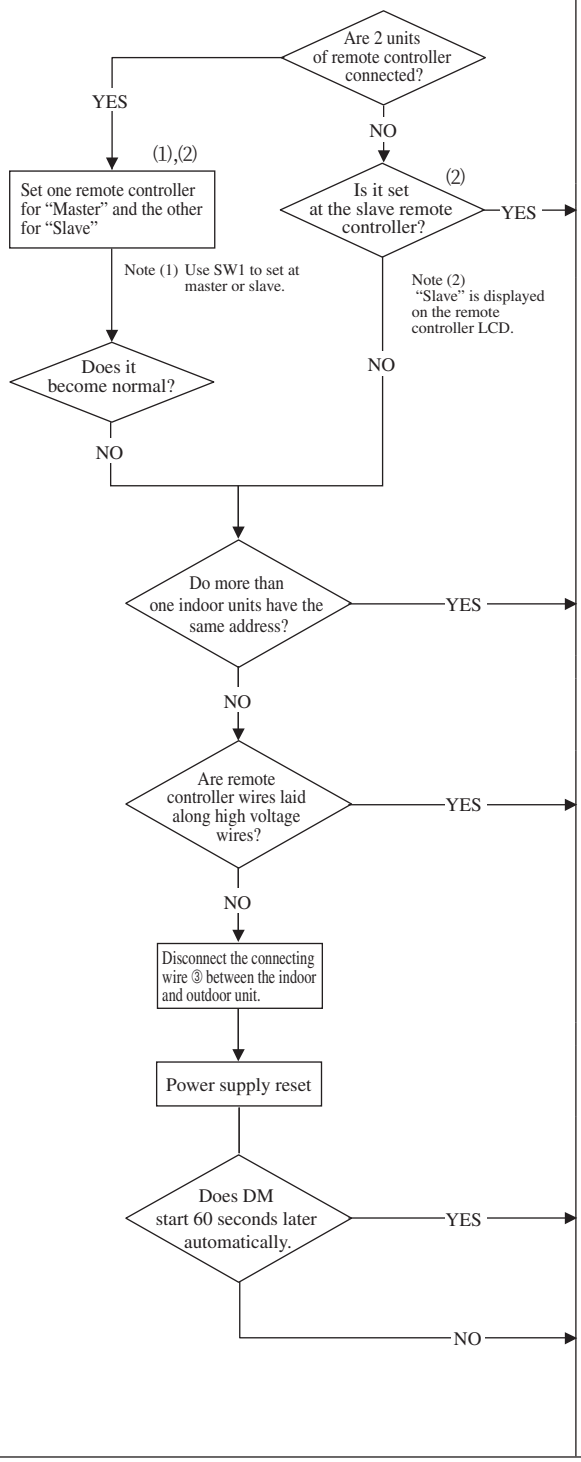
3. Condition of Error displayed

Same as above

4. Presumable cause

- Improper setting
- Surrounding environment
- Defective remote controller communication circuit
- Faulty indoor control PCB

5. Troubleshooting


Diagnosis
Countermeasure
Are 2 units of remote controller connected?
YES
NO
(1),(2)
Set one remote controller for "Master" and the other for "Slave"
(2)
Is it set at the slave remote controller?
YES
Set SW1 on remote controller PCB at "Master".
Note (1) Use SW1 to set at master or slave.
Note (2) "Slave" is displayed on the remote controller LCD.
Does it become normal?
NO
NO
Do more than one indoor units have the same address?
YES
Set address again. (SW2 on indoor control PCB)
NO
Are remote controller wires laid along high voltage wires?
YES
Separate remote controller wires from high voltage wires.
NO
Disconnect the connecting wire ③ between the indoor and outdoor unit.
Power supply reset
Does DM start 60 seconds later automatically.
YES
Defective indoor control PCB→Replace.
NO
Defective remote controller →Change.

Note: If any error is detected 30 minutes after displaying "WAIT" on the remote controller, the display changes to "INSPECT I/U".

Error code	LED	Green	Red	Content
Remote controller: INSPECT I/U	Indoor	Keeps flashing	Stays OFF	INSPECT I/U (Connection of 3 units or more remote controller)

1. Applicable model

All models

2. Error detection method

Indoor unit cannot communicate for more than 30 minutes after the power on with remote controller.

3. Condition of Error displayed

Same as above

4. Presumable cause

- Improper setting
- Surrounding environment
- Defective remote controller communication circuit
- Faulty indoor control or power PCB
- Faulty outdoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Are more than 3 units of remote controller connected? YES	Reduce to 2 units or less.
NO → Does remote controller display "Slave"? YES	Change remote controller setting to "Master". (SW1 on remote controller PCB)
NO → Do more than one indoor units have the same address? YES	Change address. (SW2 on indoor control PCB)
NO → Is it set to a slave indoor unit. SW5-1, 2? YES	Change to master. (SW5-1, 2 on indoor control PCB)
NO → Is there loose or wrong connection at the termanal of wiring between indoor and outdoor units? YES	Correct
NO → Is the grounding wire connected properly? NO	Correct
YES → Is approx. DC20V detected between ②-③ on the outdoor unit terminal block? NO	Defective outdoor control PCB→Replace.
YES → Is approx. DC20V detected between ②-③ on the indoor unit terminal block? NO	Broken connecting wire→ Correct.
YES	Defective indoor control or power PCB→Replace.

Note: If any error is detected 30 minutes after displaying "WAIT" on the remote controller, the display changes to "INSPECT I/U".

Error code	LED	Green	Red	Content
Remote controller: WAIT	Indoor	Keeps flashing	Stays OFF	Communication error at initial operation (1/3)

1. Applicable model

All models

When the remote controller LCD displays "WAIT" 2 minutes after the power on.

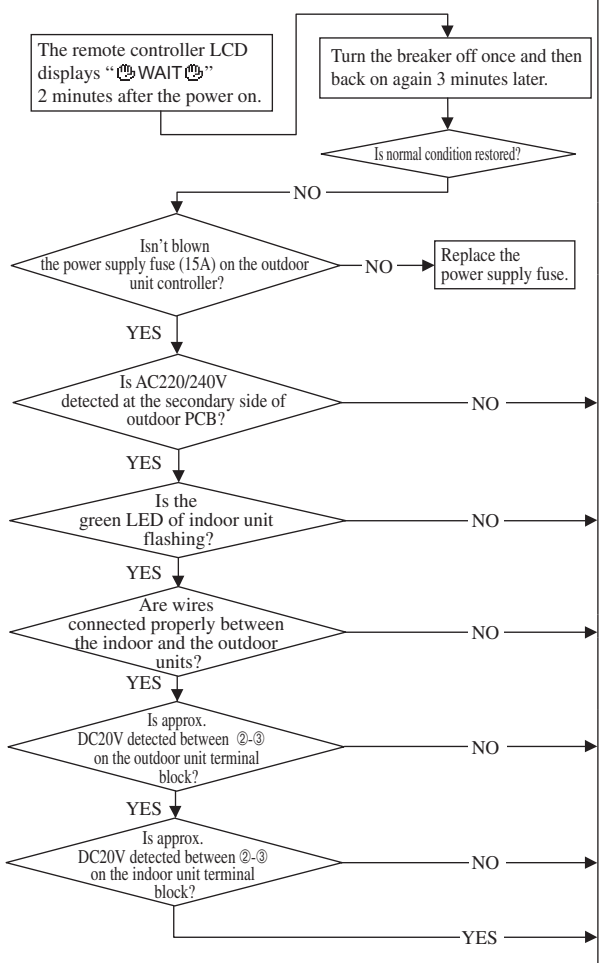
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Blown fuse
- Faulty outdoor PCB
- Connection between PCB's
- Faulty indoor control PCB
- Defective remote controller
- Broken remote controller wire

5. Troubleshooting


The remote controller LCD displays "WAIT" 2 minutes after the power on.
Turn the breaker off once and then back on again 3 minutes later.
Is normal condition restored?
NO
Isn't blown the power supply fuse (15A) on the outdoor unit controller?
NO
Replace the power supply fuse.
See next page.
YES
Is AC220/240V detected at the secondary side of outdoor PCB?
NO
Defective outdoor PCB→Replace.
YES
Is the green LED of indoor unit flashing?
NO
Defective indoor control PCB→Replace.
YES
Are wires connected properly between the indoor and the outdoor units?
NO
Replace indoor control PCB.
Correct connection wires between indoor and outdoor units.
YES
Is approx. DC20V detected between ②-③ on the outdoor unit terminal block?
NO
Defective outdoor PCB→Replace.
YES
Is approx. DC20V detected between ②-③ on the indoor unit terminal block?
NO
Defective connection wire (broken wire)
Noise
YES
Defective indoor control PCB→Replace.

Note: If any anomaly is detected during communication, the error code E5 is displayed. Inspection procedure is same as above. (Excluding matters related to connection) When the power supply is reset after the occurrence of E5, the LED will display " WAIT " if the anomaly continues. If the breaker ON/OFF is repeated in a short period of time (within 1 minute), " WAIT " may be displayed. In such occasion, turn the breaker off and wait for 3 minutes.

Error code	LED	Green	Red	Content
Remote controller: WAIT	Indoor	Keeps flashing	Stays OFF	Communication error at initial operation (2/3)

1. Applicable model

All models

When the fuse is blown, the method to inspect outdoor PCB before replacing the power supply fuse

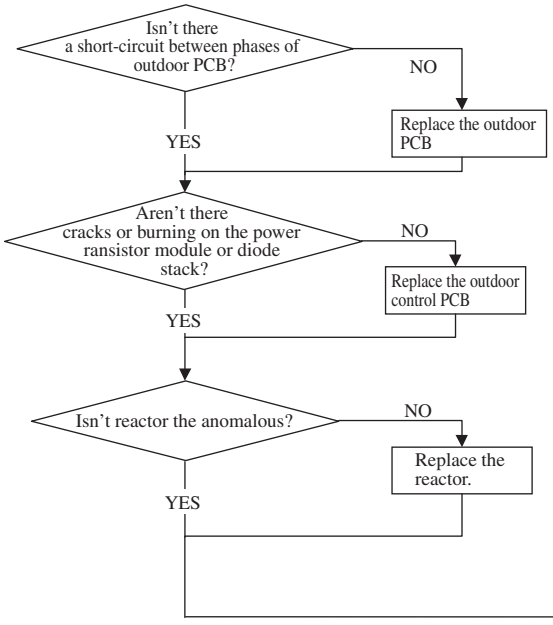
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Blown fuse
- Faulty outdoor PCB
- Faulty reactor

5. Troubleshooting

Diagnosis	Countermeasure
	Replace fuse.

Note:

Error code	LED	Green	Red	Content
Remote controller: WAIT	Indoor	Keeps flashing	Stays OFF	Communication error at initial operation (3/3)

1. Applicable model

All models

When the remote controller display is extinguished after the power on.

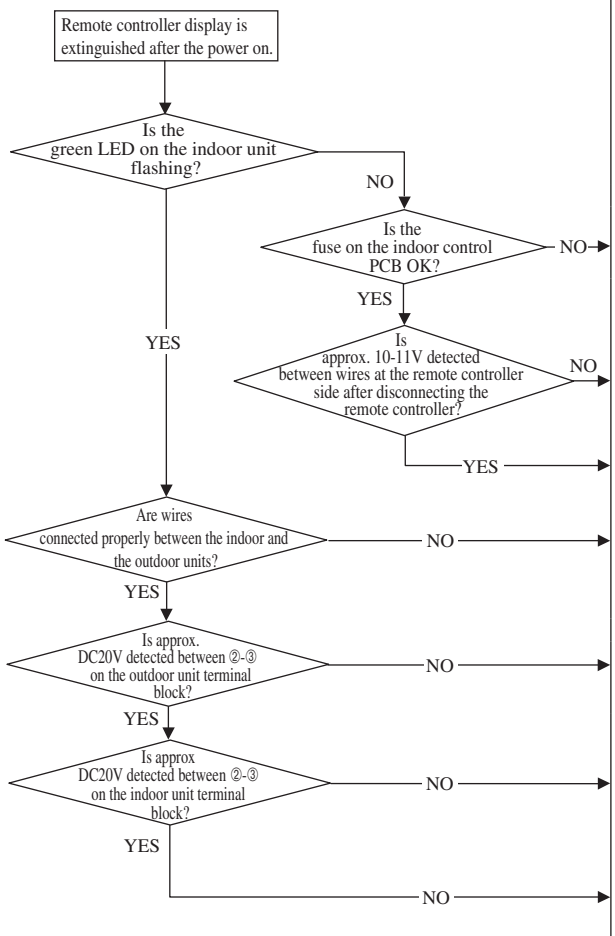
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Blown fuse
- Connection between PCB's
- Blown fuse
- Faulty indoor control PCB
- Defective remote controller
- Wire breakage on remote controller
- Faulty outdoor PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E1	Indoor	Keeps flashing	Stays OFF	Remote controller communication circuit error

1. Applicable model

All models

2. Error detection method

When normal communication between the remote controller and the indoor unit is interrupted for more than 2 minutes. (Detectable only with the remote controller)

3. Condition of Error displayed

Same as above

4. Presumable cause

- Defective communication circuit between remote controller-indoor unit
- Noise
- Defective remote controller
- Faulty indoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is it possible to reset normally by the power reset? → YES	Malfunction by noise Check peripheral environment.
NO → Turn SW7-1 to OFF. → ON Remove the wire ③ connecting between indoor/outdoor units. → Power reset → Does the drain pump restart automatically 1 minute later? → YES	Defective indoor control PCB → Replace.
NO	Defective remote controller → Replace.

Note (2) Does the remote controller still display "WAIT" even after 3 minutes?

Note: If the indoor unit cannot communicate normally with the remote controller for 180 seconds, the indoor unit PCB starts to reset automatically.

Error code	LED	Green	Red	Content
Remote controller: E5	Indoor	Keeps flashing	2 times flash	Communication error during operation

1. Applicable model

All models

2. Error detection method

When normal communication between indoor and outdoor unit is interrupted for more than 2 minutes.

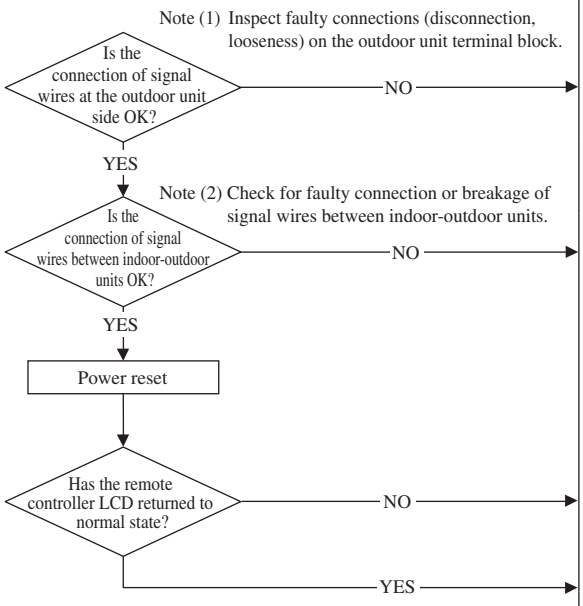
3. Condition of Error displayed

Same as above is detected during operation.

4. Presumable cause

- Unit No. setting error
- Broken remote controller wire
- Faulty remote controller wire connection
- Faulty outdoor PCB

5. Troubleshooting


Diagnosis
Countermeasure
Note (1) Inspect faulty connections (disconnection, looseness) on the outdoor unit terminal block.
Is the connection of signal wires at the outdoor unit side OK?
NO
Repair signal wires.
YES
Note (2) Check for faulty connection or breakage of signal wires between indoor-outdoor units.
Is the connection of signal wires between indoor-outdoor units OK?
NO
Repair signal wires.
YES
Power reset
Has the remote controller LCD returned to normal state?
NO
Defective outdoor PCB (Defective network communication circuit) → Replace.
YES
Unit is normal. (Malfunction by temporary noise, etc.)

Note:

Error code	LED	Green	Red	Content
Remote controller: E6	Indoor	Keeps flashing	1 time flash	Indoor heat exchanger temperature thermistor anomaly

1. Applicable model

All models

2. Error detection method

Anomalously low temperature or high temperature (resistance) is detected on the indoor heat exchanger thermistor (ThI-R1, R2 or R3).

3. Condition of Error displayed

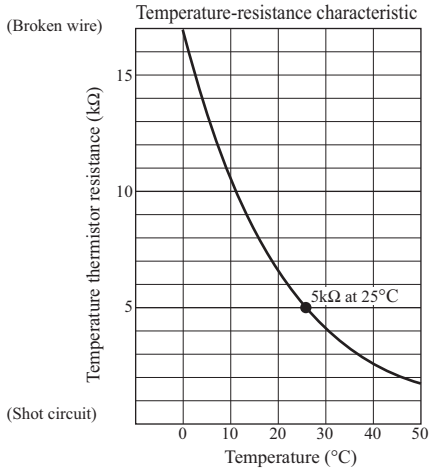
- When the temperature thermistor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.
- Or if 70°C or higher is detected for 5 seconds continuously.

4. Presumable cause

- Defective indoor heat exchanger thermistor connector
- Indoor heat exchanger temperature thermistor anomaly
- Faulty indoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of indoor heat exchanger temperature thermistor connector OK? — NO	Correct. → Insert connector securely.
YES → Are characteristics of indoor heat exchanger temperature thermistor OK? — NO	Defective indoor heat exchanger temperature thermistor → Replace.
YES	Defective indoor control PCB → Replace. (Defective indoor unit heat exchanger temperature thermistor input circuit)



Note:

Error code	LED	Green	Red	Content
Remote controller: E7	Indoor	Keeps flashing	1 time flash	Return air temperature thermistor anomaly

1. Applicable model

All models

2. Error detection method

Anomalously low temperature or high temperature (resistance) is detected by indoor return air temperature thermistor (Thi-A)

3. Condition of Error displayed

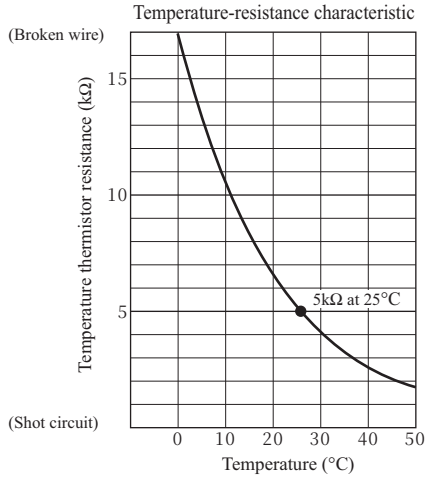
- When the temperature thermistor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.

4. Presumable cause

- Defective return air temperature thermistor connector
- Defective return air temperature thermistor
- Faulty indoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of return air temperature thermistor connector OK? — NO	Correct. → Connect connector.
YES → Are the characteristics of return air temperature thermistor OK? — NO	Defective return air temperature thermistor → Replace.
YES	Defective indoor control PCB → Replace. (Defective return air temperature thermistor input circuit)



Note:

Error code	LED	Green	Red	Content
Remote controller: E8	Indoor	Keeps flashing	1 time flash	Heating overload operation

1. Applicable model

All models

2. Error detection method

Indoor heat exchanger temperature thermistor (ThI-R1, R2, R3)

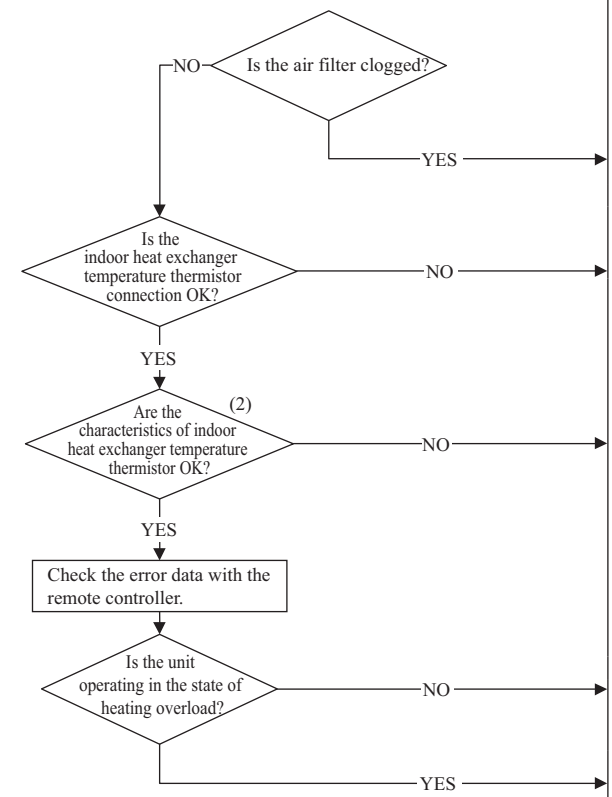
3. Condition of Error displayed

When it is detected 5 times within 60 minutes from initial detection or when the overload condition is detected for 6 minutes continuously.

4. Presumable cause

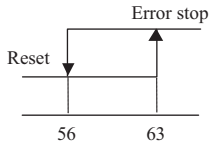
- Clogged air filter
- Defective indoor heat exchanger temperature thermistor connector
- Defective indoor heat exchanger temperature thermistor
- Anomalous refrigerant system

5. Troubleshooting



Note (1) Judge if it is in the state of overload or not as follows.
- ▲ Is there any short-circuit of air?
- ▲ Isn't there any fouling or clogging on the indoor heat exchanger?
- ▲ Is the outdoor fan control normal?
- ▲ Isn't the indoor and outdoor air temperature too high?

Note (2) For characteristics of indoor heat exchanger temperature thermistor, see the error display E6.



Note: During heating operation; After starting compressor, compressor rotation speed is decreased by detecting indoor heat exchanger temperature (ThI-R) in order to control high pressure.

Error code	LED	Green	Red	Content
Remote controller: E9	Indoor	Keeps flashing	1 time flash	Drain trouble

1. Applicable model

All models

2. Error detection method

Float switch is activated

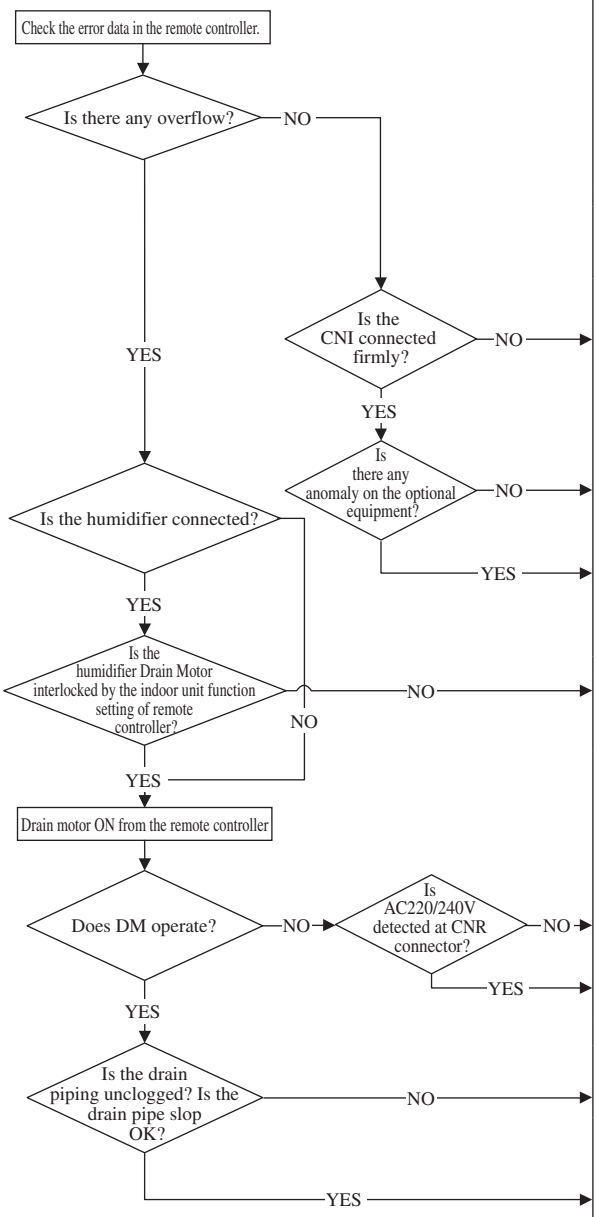
3. Condition of Error displayed

If the float switch OPEN is detected for 3 seconds continuously or if float switch connector or wire is disconnected.

4. Presumable cause

- Defective indoor control or power PCB
- Float switch setting error
- Humidifier DM interlock setting error
- Optional equipment setting error
- Drain piping error
- Defective drain motor
- Disconnection of drain motor wiring

5. Troubleshooting



Note: When this error occurred at power ON, disconnection of wire or connector of the float switch is suspected. Check and correct it (or replace it, if necessary).

Error code	LED	Green	Red	Content
Remote controller: E10	Indoor	Keeps flashing	Stays OFF	Excessive number of connected indoor units (more than 17 units) by controlling with one remoto controller

1. Applicable model

All models

2. Error detection method

When it detects more than 17 of indoor units connected to one remote contorller

3. Condition of Error displayed

Same as above

4. Presumable cause

- Excessive number of indoor units connected
- Defective remote controller

5. Troubleshooting

Diagnosis	Countermeasure
Aren't more than 17 indoor units connected to one remote controller? → NO	Defective remote controller → Replace.
YES	Reduce to 16 or less units.

Note:

Error code	LED	Green	Red	Content
Remote controller: E16	Indoor	Keeps flashing	Stays OFF	Indoor fan motor anomaly

1. Applicable model

All models

2. Error detection method

Detected by rotation speed of indoor fan motor

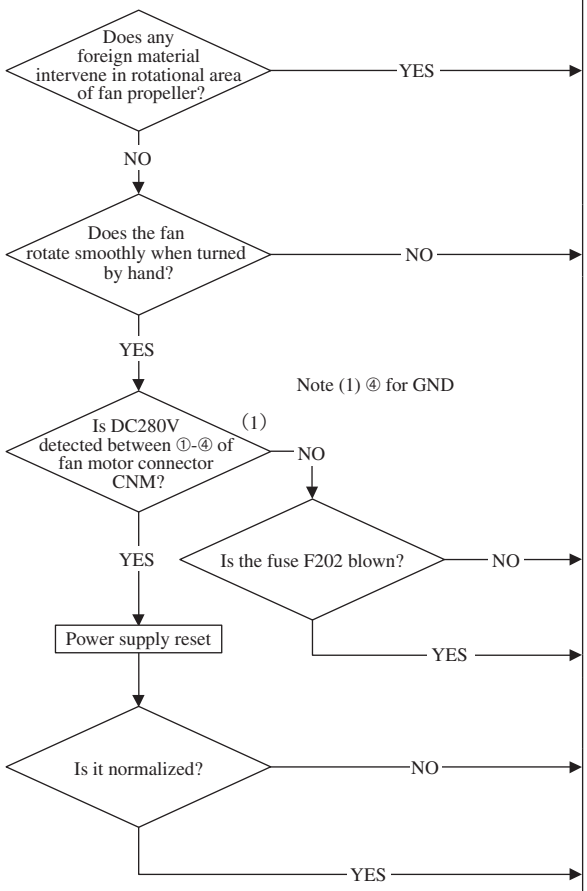
3. Condition of Error displayed

When actual rotation speed of indoor fan motor drops to lower than 200rpm for 30 seconds continuously, the compressor and the indoor fan motor stop. After 2-seconds, it starts again automatically, but if this error occurs 4 times within 60 minutes after the initial detection.

4. Presumable cause

- Defective indoor power PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on control PCB
- Blown fuse
- External noise, surge

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E19	Indoor	Keeps flashing	1 time flash	Indoor unit operation check, drain motor check setting error

1. Applicable model

All models

2. Error detection method

After indoor operation check, when the communication between indoor and outdoor unit is established and SW7-1 is still kept ON.

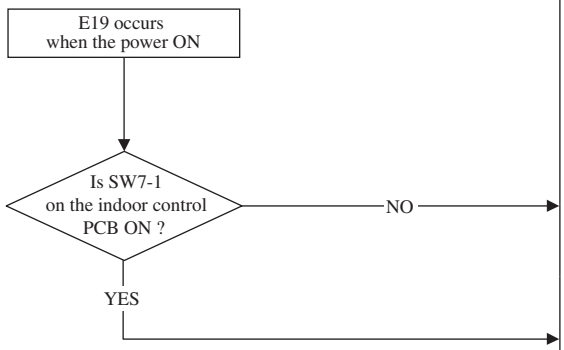
3. Condition of Error displayed

Same as above

4. Presumable cause

Mistake in SW7-1 setting
(Due to forgetting to turn OFF SW7-1 after indoor operation check)

5. Troubleshooting



Diagnosis	Countermeasure
Is SW7-1 on the indoor control PCB ON ? NO	Defective indoor control PCB (Defective SW7) →Replace
Is SW7-1 on the indoor control PCB ON ? YES	Turn SW7-1 on the indoor control PCB OFF and reset the power

Note:

Error code	LED	Green	Red	Content
Remote controller: E28	Indoor	Keeps flashing	Stays OFF	Remote controller temperature thermistor anomaly

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) of remote controller temperature thermistor (Thc)

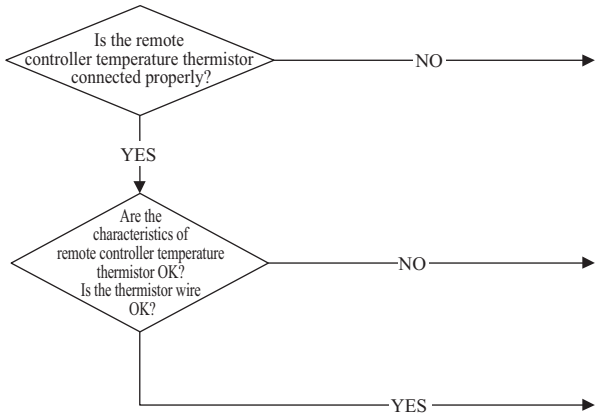
3. Condition of Error displayed

When the temperature thermistor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.

4. Presumable cause

- Faulty connection of remote controller temperature thermistor
- Defective remote controller temperature thermistor
- Defective remote controller PCB

5. Troubleshooting


Diagnosis
Countermeasure
Is the remote controller temperature thermistor connected properly?
NO
Correct.
YES
Are the characteristics of remote controller temperature thermistor OK? Is the thermistor wire OK?
NO
Defective remote controller temperature thermistor → Replace.
YES
Defective remote controller PCB → Replace. (Defective remote controller temperature thermistor input circuit)

Resistance-temperature characteristics of remote controller temperature thermistor (ThC)

Temperature (°C)	Resistance value (kΩ)	Temperature (°C)	Resistance value (kΩ)
0	65	30	16
1	62	32	15
2	59	34	14
4	53	36	13
6	48	38	12
8	44	40	11
10	40	42	9.9
12	36	44	9.2
14	33	46	8.5
16	30	48	7.8
18	27	50	7.3
20	25	52	6.7
22	23	54	6.3
24	21	56	5.8
26	19	58	5.4
28	18	60	5.0

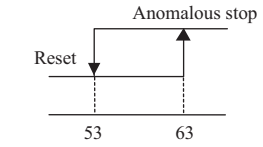
Note: After 10 seconds has passed since remote controller thermistor was switched from valid to invalid, E28 will not be displayed even if the thermistor harness is disconnected. At same time the thermistor, which is effective, is switched from remote controller thermistor to indoor return air temperature thermistor. Even though the remote controller thermistor is set to be Effective, the return air temperature displayed on remote controller for checking still shows the value detected by indoor return air temperature thermistor, not by remote controller temperature thermistor.

Error code	LED	Green	Red	Content
Remote controller: E35	Indoor	Keeps flashing	Stays OFF	Cooling overload operation

1. Applicable model

All models

2. Error detection method



3. Condition of Error displayed

When anomalous outdoor heat exchanger temperature occurs 5 times within 60 minutes or 63°C or higher continues for 10 minutes, including the compressor stop.

4. Presumable cause

- Defective outdoor heat exchanger temperature sensor
- Defective outdoor PCB
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger
- Excessive refrigerant quantity

5. Troubleshooting

Diagnosis	Countermeasure
* For the characteristics of outdoor heat exchanger temperature sensor, refer to E37. Are normal the characteristics of outdoor heat exchanger temperature sensor normal? NO	Replace outdoor heat exchanger temperature sensor.
YES Is the unit operating in the state of cooling overload? YES	Check unit side. • Isn't the air circulation of outdoor unit short-circuited? • Are installation spaces adequate? • Isn't there any fouling or clogging on heater exchanger?
NO Is the high pressure control normal NO	Control operation check*
YES Is the temperature (measured actually) at direction of error correct? NO	Defective outdoor PCB→Replace.
YES	Excessive refrigerant amount: Recharge refrigerant by weighing proper amount on a scale.

Note:

Error code	LED	Green	Red	Content
Remote controller: E36	Indoor	Keeps flashing	Stays OFF	Discharge pipe temperature error

1. Applicable model

All models

2. Error detection method

For the error detection method, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

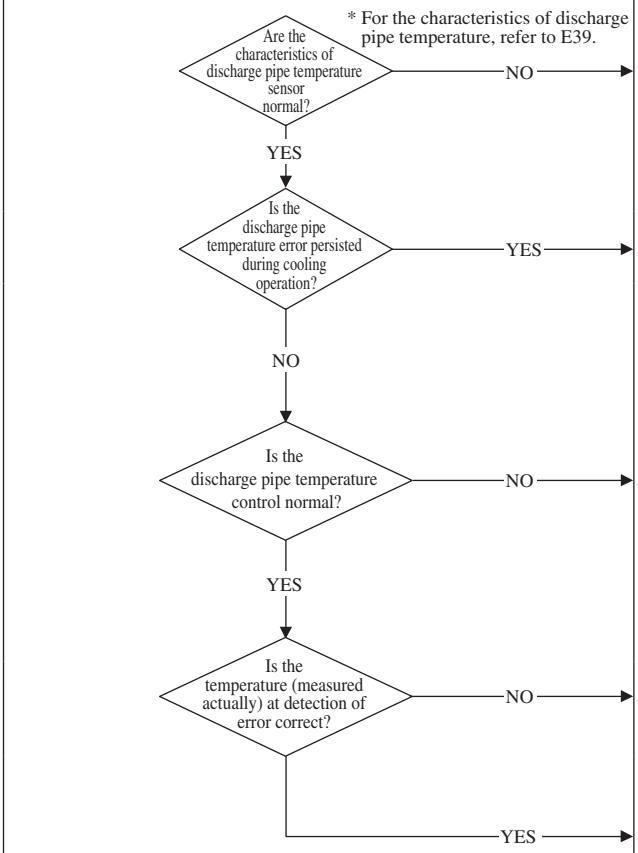
3. Condition of Error displayed

When discharge pipe temperature anomaly is detected 2 times within 60 minutes is compressor stop.

4. Presumable cause

- Defective outdoor PCB
- Defective discharge pipe temperature sensor
- Clogged filter
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger

5. Troubleshooting


Diagnosis
Countermeasure
* For the characteristics of discharge pipe temperature, refer to E39.
Are the characteristics of discharge pipe temperature sensor normal?
NO
Replace discharge pipe temperature sensor.
YES
Is the discharge pipe temperature error persisted during cooling operation?
YES
Insufficient refrigerant amount : Recharge refrigerant by weighing proper amount on a scale.
NO
Is the discharge pipe temperature control normal?
NO
Control operation check *
YES
Is the temperature (measured actually) at detection of error correct?
NO
Defective outdoor PCB→Replace.
YES
Check unit side:
• Isn't filter clogged?
• Are adequate indoor, outdoor unit installation spaces?
• Isn't there any short-circuit of air?
• Isn't there any fouling, clogging on indoor heat exchanger?

* For the contents of control, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

Note:

Error code	LED	Green	Red	Content
Remote controller: E37	Indoor	Keeps flashing	Stays OFF	Outdoor heat exchanger temperature sensor anomaly

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on the outdoor heat exchanger temperature sensor

3. Condition of Error displayed

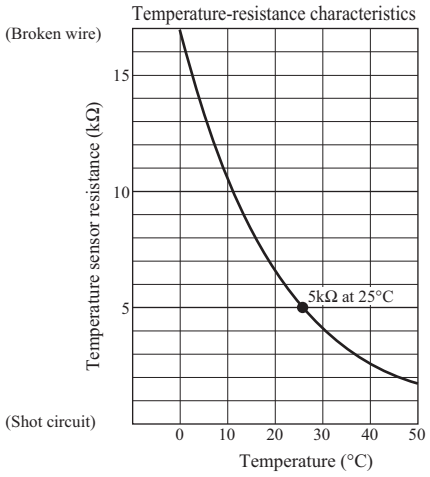
- When the temperature sensor detects -55 °C or lower for 20 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.
- When -55 °C or lower is detected for within 20 second after power ON.

4. Presumable cause

- Defective outdoor PCB
- Broken sensor harness or temperature sensing section
- Disconnected wire connection (connector)

5. Troubleshooting

Diagnosis	Countermeasure
Is the outdoor heat exchanger temperature sensor connector connected properly? → NO	Correct connector.
YES → For the characteristics of outdoor heat exchanger temperature sensor, see the following graph. Are the characteristics of outdoor heat exchanger temperature sensor OK? → NO	Defective outdoor heat exchanger temperature sensor→Replace.
YES	Defective outdoor PCB→Replace. (Defective outdoor heat exchanger temperature sensor input circuit)



Note:

Error code	LED	Green	Red	Content
Remote controller: E38	Indoor	Keeps flashing	Stays OFF	Outdoor air temperature sensor anomaly

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on outdoor air temperature sensor

3. Condition of Error displayed

- When the temperature sensor detects -55 °C or lower for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.
- When -55 °C or lower is detected for within 20 second after power ON.

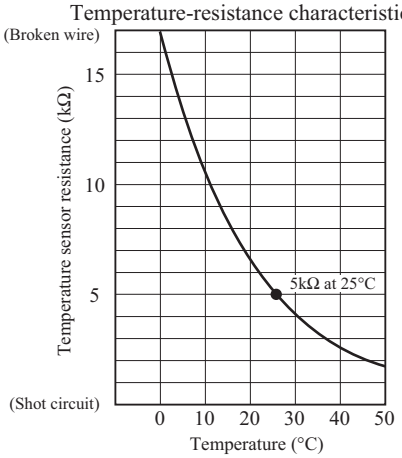
4. Presumable cause

- Defective outdoor PCB
- Broken sensor harness or temperature sensing section (Check molding.)
- Disconnected wire connection (connector)

5. Troubleshooting

Diagnosis	Countermeasure
Is the outdoor air temperature sensor connector connected properly? → NO	Correct connector.
YES → For the characteristics of outdoor air temperature sensor, see the following graph. Is the characteristics of the outdoor air temperature sensor OK? → NO	Defective outdoor air temperature sensor→ Replace.
YES	Defective outdoor PCB→Replace. (Defective outdoor air temperature sensor input circuit)

Temperature-resistance characteristics



Note:

Error code	LED	Green	Red	Content
Remote controller: E39	Indoor	Keeps flashing	Stays OFF	Discharge pipe temperature sensor anomaly

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on the discharge pipe temperature sensor

3. Condition of Error displayed

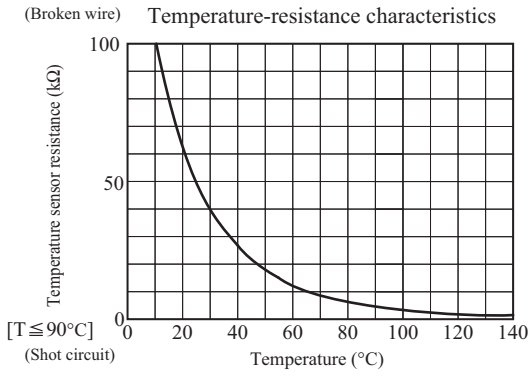
When the temperature sensor detects -25 °C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.

4. Presumable cause

- Defective outdoor PCB
- Broken sensor harness or temperature sensing section (Check molding.)
- Disconnected wire connection (connector)

5. Troubleshooting

Diagnosis	Countermeasure
Is the discharge pipe temperature sensor connector connected properly? → NO	Correct connector.
YES → Are the characteristics of discharge pipe temperature sensor OK? (For the characteristics of discharge pipe temperature sensor, see the following graph.) → NO	Defective discharge pipe temperature sensor→ Replace.
YES	Defective outdoor PCB→Replace. (Defective temperature sensor input circuit)



Note:

Error code	LED	Green	Red	Content
Remote controller: E42	Indoor control PCB	Keeps flashing	Stays OFF	Current cut (1/2)

1. Applicable model

All models

2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

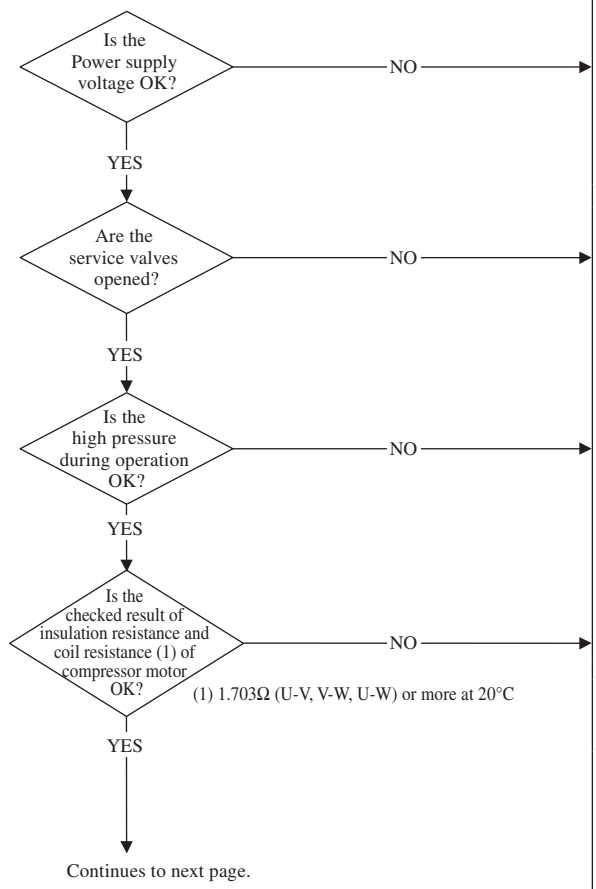
3. Condition of Error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.

4. Presumable cause

- The valves closed
- Faulty power supply
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module

5. Troubleshooting


Diagnosis
Countermeasure
Is the Power supply voltage OK?
NO
Check power supply.
YES
Are the service valves opened?
NO
Open the valves.
YES
Is the high pressure during operation OK?
NO
Check refrigerant amount and refregerant circuit
*In case of transitional increase of high pressure and/or test run, several times restarting may recover it, because liquid refrigerant (migrated) in the compresser is discharged from the compressor.
YES
Is the checked result of insulation resistance and coil resistance (1) of compressor motor OK?
NO
Replace compressor.
(1) 1.703Ω (U-V, V-W, U-W) or more at 20°C
YES
Continues to next page.

Note:

Error code	LED	Green	Red	Content
Remote controller: E42	Indoor	Keeps flashing	Stays OFF	Current cut (2/2)

1. Applicable model

All models

2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

3. Condition of Error displayed

• If the output current of inveter exceeds the specifications, it makes the compressor stopping.

4. Presumable cause

• Defective outdoor PCB
• Faulty power supply
• Insufficient refrigerant amount
• Faulty compressor
• Faulty power transistor module

5. Troubleshooting

Diagnosis	Countermeasure
Continue from previous page	
Is the checked result of power transistor module OK? — NO	• Defective outdoor PCB→Replace.
YES	
• Is the space for installation of indoor and/or outdoor unit enough? • Is there any short circuit of air on indoor and/or outdoor unit? • At cooling, does the outdoor fan motor run? Are the service valves fully opened? Is the filter clogged? • At heating, does the indoor fan motor run? Are the service valves fully opened? Is the filter clogged? • Is there any liquid flooding? Is the superheat within normal range? Is the low pressure sensor and suction pipe temperature thermistor normal? • Is there any anoumalous sound on the compressor?	
YES	
After resetting power for several times does it become normal? — NO	• Defective outdoor PCB→Replace.
YES	
Temporary noise may cause of anomaly. If noise source can be found, take countermeasure.	

Note:

Error code	LED	Green	Red	Content
Remote controller: E47	Indoor	Keeps flashing	Stays OFF	Active filter voltage error

1. Applicable model

All models

2. Error detection method

Error is displayed if the converter voltage exceeds DC340V (3 times within 20 minutes). Remote controller may be set after 3 minutes delay.

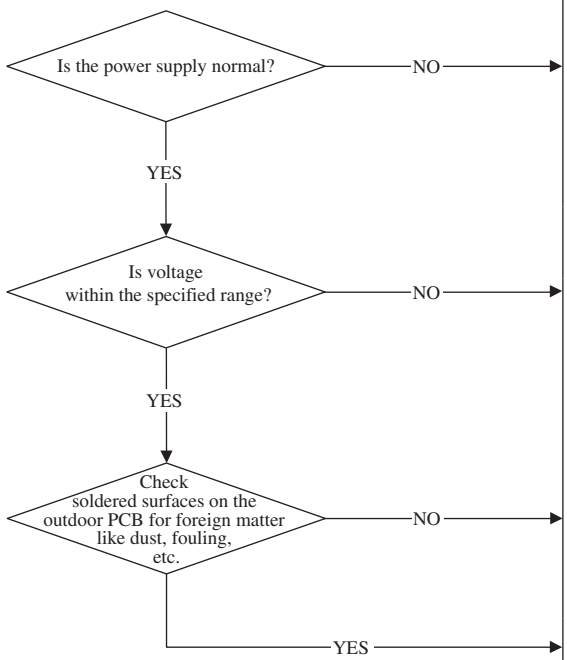
3. Condition of Error displayed

Same as above

4. Presumable cause

- Defective outdoor PCB
- Dust on outdoor PCB
- Anomalous power supply

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E48	Indoor	Keeps flashing	Stays OFF	Outdoor fan motor anomaly

1. Applicable model

All models

2. Error detection method

Detected by rotation speed of outdoor fan motor

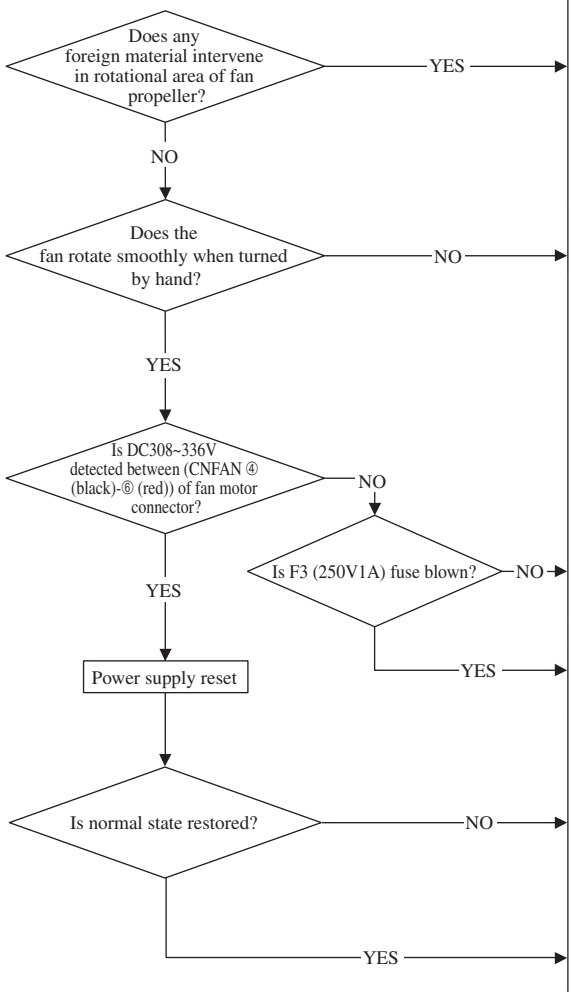
3. Condition of Error displayed

When actual rotation speed of outdoor fan motor drops to 75min^{-1} or lower for 30 minutes continuously, the compressor and the outdoor fan motor stop. After 3-minutes delay, it starts again automatically, but if this anomaly occurs 3 times within 60 minutes after the initial detection.

4. Presumable cause

- Defective outdoor PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on outdoor PCB
- Blown F3 fuse

5. Troubleshooting


Diagnosis
Countermeasure
Does any foreign material intervene in rotational area of fan propeller?
YES
Remove foreign matter.
NO
Does the fan rotate smoothly when turned by hand?
NO
Replace fan motor. If resistance between ① (Vm):blue -④(GND):black is detected 1kΩ or lower, it is faulty.
YES
Is DC308~336V detected between (CNFAN ④ (black)-⑥ (red)) of fan motor connector?
NO
Is F3 (250V1A) fuse blown?
NO
Check power supply voltage.
YES
YES
Replace faulty fan motor and outdoor PCB.
Power supply reset
Is normal state restored?
NO
Replace fan motor (If anomaly persists after replacing fan motor, replace outdoor PCB.)
YES
Malfunction by temporary noise

Note: When E48 error occurs, in almost cases F3 fuse (1A) on the outdoor PCB is blown. There are a lot of cases that fuse is blown and E48 occurs due to defective fan motor. And even though only the outdoor PCB (or fuse) is replaced,, another trouble could occur. Therefore when fuse is blown, check whether the fan motor is OK or not.
After confirming the fan motor normal, check by power ON. (Don't power ON without confirming the fan motor normal.)

Error code	LED	Green	Red	Content
Remote controller: E51	Indoor	Keeps flashing	Stays OFF	Power transistor anomaly

1. Applicable model

All models

2. Error detection method

Power transistor primary current

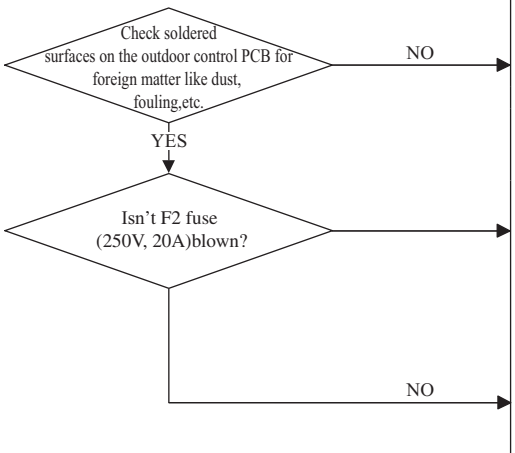
3. Condition of Error displayed

If the power transistor primary current exceeds the setting value for 3 seconds, the compressor stops.

4. Presumable cause

- Faulty outdoor PCB
- Dust on control PCB
- Blown F2 fuse

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E57	Indoor	Keeps flashing	Stays OFF	Insufficient refrigerant amount or detection of service valve closure

1. Applicable model

All models

2. Error detection method

- Judge insufficient refrigerant amount by detecting the temperature differnce between indoor heat exchanger (ThI-R) and indoor return air (ThI-A).

3. Condition of Error displayed

When the insufficient refrigerant amount is detected 3 times within 60 minutes.

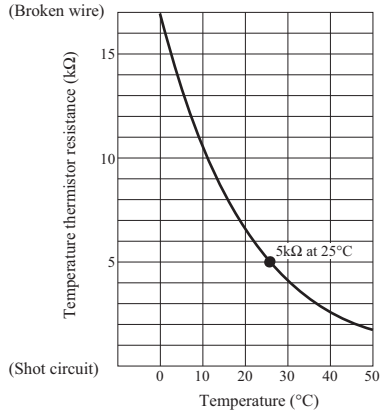
4. Presumable cause

- Defective indoor heat exchanger temperature thermistor
- Defective indoor return air temperature thermistor
- Defective indoor control PCB
- Insufficient refregerant amount

5. Troubleshooting

Diagnosis	Countermeasure
Is the service valve fully opened? NO	Open fully.
YES → Are the connections of indoor heat exchanger and/or return air temperature thermistor connectors OK? NO	Correct indoor heat exchanger, return air temperature thermistor connector connections.
YES → Are the characteristics of indoor heat exchanger and/or return air temperature thermistor OK? NO	Defective indoor heat exchanger, return air temperature thermistor → Replace.
YES → Is the low pressure during operation normal? NO	Charge refrigerant.
YES	Defective indoor control PCB→Replace. (Defective indoor heat exchanger, return air temperature thermistor input circuits)

Indoor heat exchanger, return air temperature thermistor
Temperature-resistance characteristics



Note: When the compressor speed is 50 rps or under at 5 minutes after the start of compressor or the completion of defrosting, the low refrigerant protection control judges, by detecting the difference between the indoor heat exchanger temperature (ThI-R) and the indoor return air temperature (ThI-A), that it is in the state of gas low, and stops the compressor.
Cooling: Indoor return air temperature (ThI-A) – Indoor heat exchanger temperature (ThI-R) ≧ 4 deg
Heating: Indoor heat exchanger temperature (ThI-R) – Indoor return air temperature (ThI-A) ≦ 6 deg

Error code	LED	Green	Red	Content
Remote controller: E58	Indoor	Keeps flashing	Stays OFF	Current safe stop

1. Applicable model

All models

2. Error detection method

When the current safe control has operated at the compressor speed of 30 rps or under:

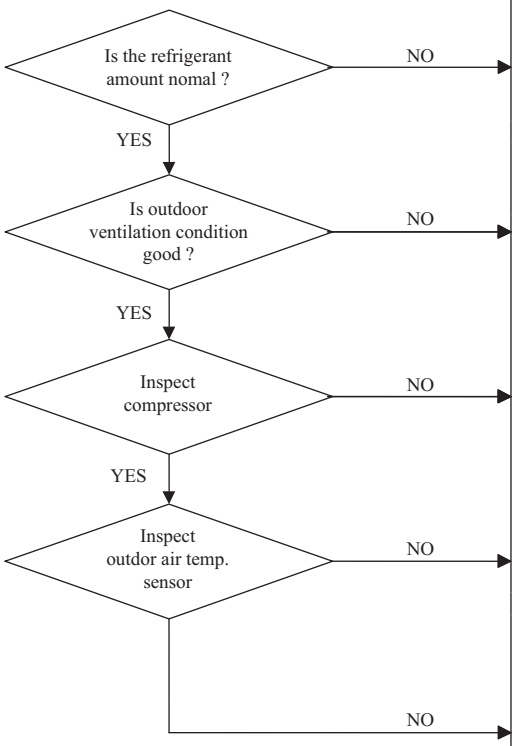
3. Condition of Error displayed

Same as above

4. Presumable cause

- Excessive refrigerant amount
- Indoor,outdoor unit installation spaces
- Faulty compressor
- Defective outdor air temp. sensor
- Defective outdoor PCB

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E59	Indoor	Keeps flashing	Stays OFF	Compressor startup failure

1. Applicable model

All models

2. Error detection method

If it fails to change over to the rotor detection operation of compressor motor

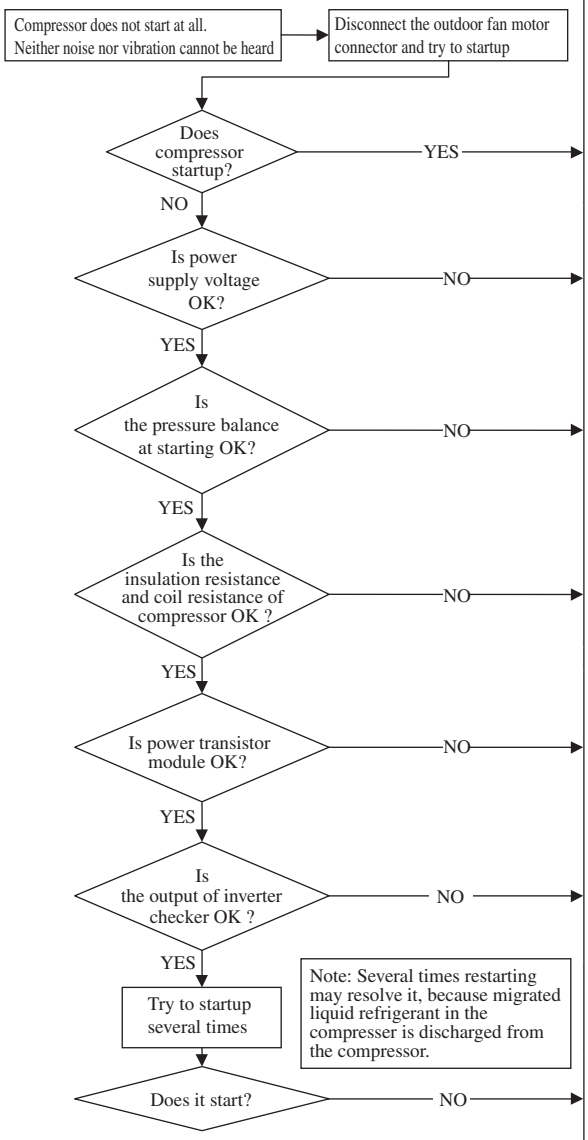
3. Condition of Error displayed

If compressor fails to startup for 42 times

4. Presumable cause

- Faulty outdoor fan motor
- Faulty outdoor PCB
- Anomalous power supply voltage
- Improper refrigerant amount and refrigerant circuit
- Faulty compressor (Motor bearing)

5. Troubleshooting



Note: Insulation resistance
- The unit is left for long period without power supply or soon after installation, migrated liquid refrigerant may dissolve in the refrigerant oil in the compressor. In such case insulation resistance decreases upto several MΩ or lower. If the electric leakage breaker is activated due to low insulation resistance, check followings.
  ① Check whehter the insulation resistance can recover or not, ater 6 hours has passed since power ON. (By energize the crankcase heater, migrated liquid refrigerant in the refrigerant oil in compressor can be evaporated)
  ② Check whether the electric leakage breake conforms to high-hermonic specifications (As units has inverter, in order to prevent from improper operation, be sure to use high-hermonic one.)

Error code	LED	Green	Red	Content
Remote controller: E60	Indoor	Keeps flashing	Stays OFF	Compressor rotor lock error

1. Applicable model

All models

2. Error detection method

Compressor rotor position

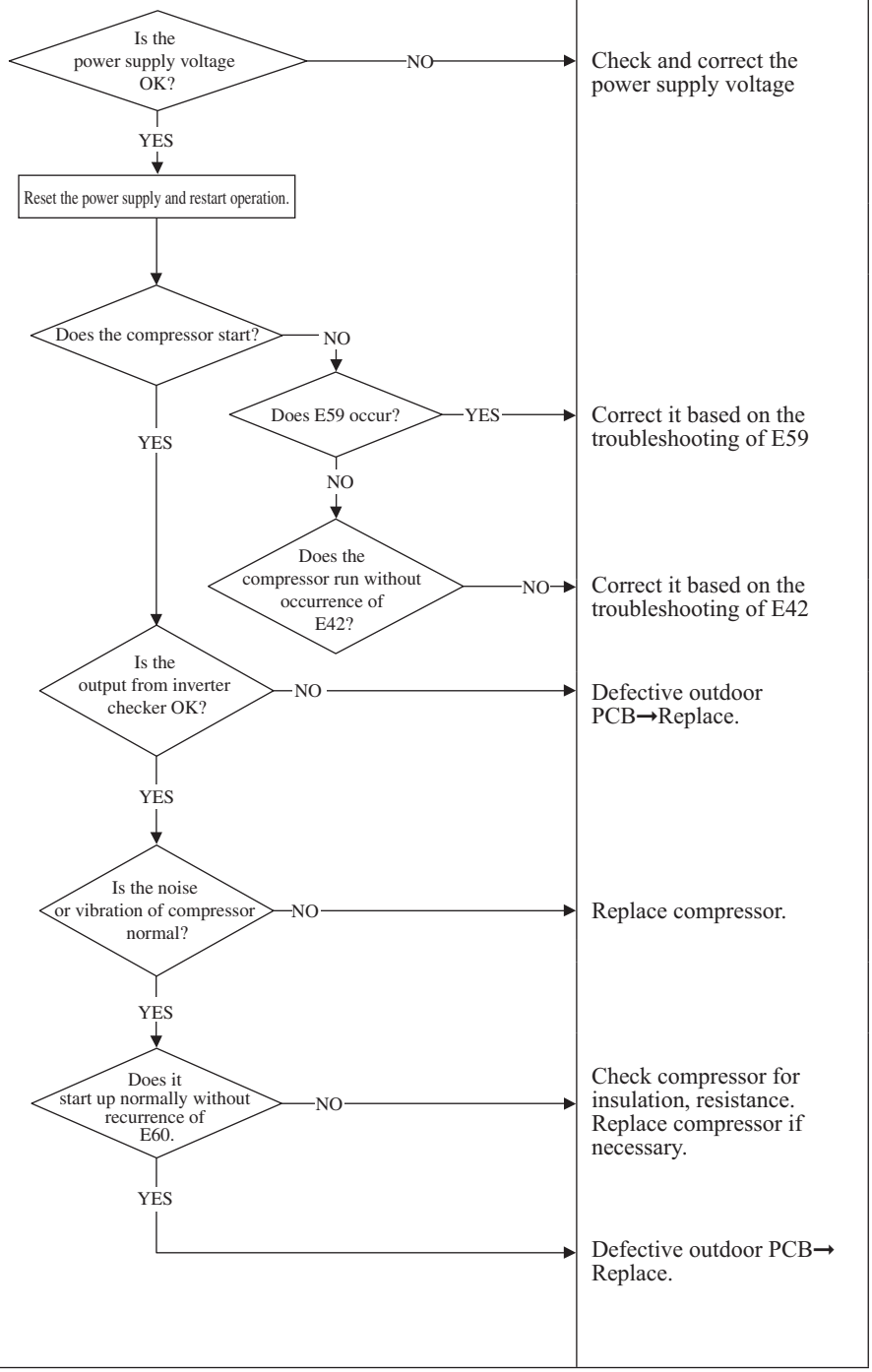
3. Condition of Error displayed

If it fails again to detect the rotor position after shifting to the compressor rotor position detection operation, the compressor stops.

4. Presumable cause

- Defective outdoor fan motor
- Defective outdoor PCB
- Anomalous power supply voltage
- Improper refrigerant amount and refrigerant circuit
- Defective compressor (motor, bearing)

5. Troubleshooting



Note: Insulation resistance
- The unit is left for long period without power supply or soon after installation, migrated liquid refrigerant may dissolve in the refrigerant oil in the compressor. In such case insulation resistance decreases upto several MΩ or lower. If the electric leakage breaker is activated due to low insulation resistance, check followings.
  ① Check whehter the insulation resistance can recover or not, ater 6 hours has passed since power ON. (By energize the crankcase heater, migrated liquid refrigerant in the refrigerant oil in compressor can be evaporated)
  ② Check whether the electric leakage breake conforms to high-hermonic specifications (As units has inverter, in order to prevent from improper operation, be sure to use high-hermonic one.)

12. OPTION PARTS

12.1 Instullation of wired remote controller (RC-E4)

PJA012D729A A

Read together with indoor unit's installation manual.

⚠WARNING

- Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connection or hold will cause abnormal heat generation or fire.
- Make sure the power supply is turned off when electric wiring work.
  Otherwise, electric shock, malfunction and improper running may occur.

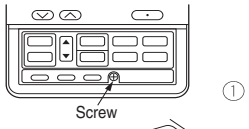
⚠CAUTION

- DO NOT install the remote controller at the following places in order to avoid malfunction.
  (1) Places exposed to direct sunlight
  (2) Places near heat devices
  (3) High humidity places
  (4) Hot surface or cold surface enough to generate condensation
  (5) Places exposed to oil mist or steam directly
  (6) Uneven surface
- DO NOT leave the remote controller without the upper case.
  In case the upper cace needs to be detached, protect the remote controller with a packaging box or bag in order to keep it away from water and dust.

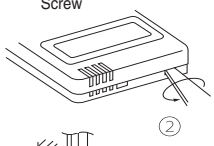
Accessories	Remote controller, wood screw (ø3.5×16) 2 pieces
Prepare on site	Remote controller cord (2 cores) the insulated thickness in 1mm or more. [In case of embedding cord] Erectrical box, M4 screw (2 pieces) [In case of exposing cord] Cord clamp (if needed)

Installation procedure

① Open the cover of remote controller , and remove the screw under the buttons without fail.

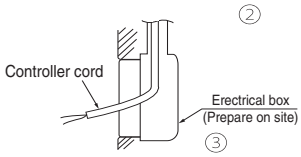


② Remove the upper case of remote controller.
Insert a flat-blade screwdriver into the dented part of the upper part of the remote controller, and wrench slightly.

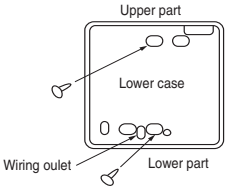


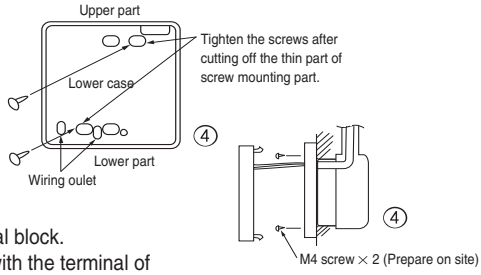
[In case of embedding cord]

③ Embed the erectrical box and remote controller cord beforehand.



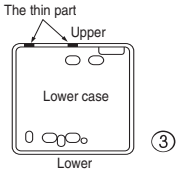
④ Prepare two M4 screws (recommended length is 12-16mm) on site, and install the lower case to erectrical box.
Choose either of the following two positions in fixing it with screws.





⑤ Connect the remote controller cord to the terminal block.
Connect the terminal of remote controller (X,Y) with the terminal of indoor unit (X,Y). (X and Y are no polarity)

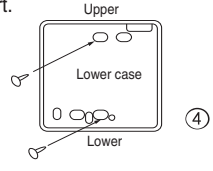
⑥ Install the upper case as before so as not to catch up the remote controller cord, and tighten with the screws.



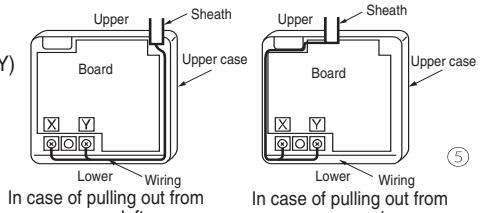
[In case of exposing cord]

③ You can pull out the remote controller cord from left upper part or center upper part.
Cut off the upper thin part of remote controller lower case with a nipper or knife, and grind burrs with a file etc.

④ Install the lower case to the flat wall with attached two wooden screws.

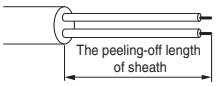


⑤ Connect the remote controller cord to the terminal block.
Connect the terminal of remote controller (X,Y) with the terminal of indoor unit (X,Y).
(X and Y are no polarity)
Wiring route is as shown in the right diagram depending on the pulling out direction.



The wiring inside the remote controller case should be within 0.3mm^2 (recommended) to 0.5mm^2.
The sheath should be peeled off inside the remote controller case.
The peeling-off length of each wire is as below.

Pulling out from upper left	Pulling out from upper center
X wiring : 215mm Y wiring : 195mm	X wiring : 170mm Y wiring : 190mm



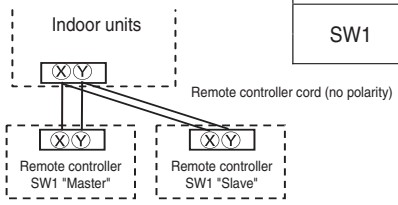
⑥ Install the upper case as before so as not to catch up the remote controller cord, and tighten with the screws.
⑦ In case of exposing cord, fix the cord on the wall with cord clamp so as not to slack.

Installation and wiring of remote controller

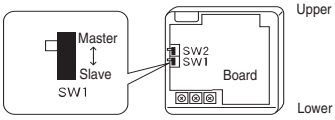
① Wiring of remote controller should use 0.3mm^2 × 2 core wires or cables. (on-site configuration)
② Maximum prolongation of remote controller wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, wiring in the remote controller case should be under 0.5mm^2 . Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire connecting section. Be careful about contact failure.
100 - 200m·····0.5mm^2 × 2 cores
Under 300m·····0.75mm^2 × 2 cores
Under 400m·····1.25mm^2 × 2 cores
Under 600m·····2.0mm^2 × 2 cores

Master/ slave setting when more than one remote controllers are used

A maximum of two remote controllers can be connected to one indoor unit (or one group of indoor units.)



Switch	Setting	Contents
SW1	M	Master remote controller
	S	Slave remote controller

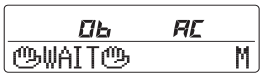


Set SW1 to "Slave" for the slave remote controller. It was factory set to "Master" for shipment.
Note: The setting "Remote controller thermistor enabled" is only selectable with the master remote controller in the position where you want to check room temperature.
The air conditioner operation follows the last operation of the remote controller regardless of the master/ slave setting of it.

The indication when power source is supplied

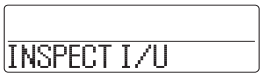
When power source is turned on, the following is displayed on the remote controller until the communication between the remote controller and indoor unit settled.
Master remote controller : "WAIT M"
Slave remote controller : "WAIT S"

At the same time, a mark or a number will be displayed for two seconds first.
This is the software's administration number of the remote controller, not an error cord.



※ The left mark is only an example. Other marks may appear.

When remote controller cannot communicate with the indoor unit for half an hour, the below indication will appear.
Check wiring of the indoor unit and the outdoor unit etc.



The range of temperature setting

When shipped, the range of set temperature differs depending on the operation mode as below.

Heating : 16~30˚C (55~86˚F)

Except heating (cooling, fan, dry, automatic) : 18~30˚C (62~86˚F)

●Upper limit and lower limit of set temperature can be changed with remote controller.

Upper limit setting: valid during heating operation. Possible to set in the range of 20 to 30˚C (68 to 86˚F).

Lower limit setting: valid except heating (automatic, cooling, fan, dry) Possible to set in the range of 18 to 26˚C (62 to 79˚F).

When you set upper and lower limit by this function, control as below.

1. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "INDN CHANGE" (factory setting),
   【If upper limit value is set】
   During heating, you cannot set the value exceeding the upper limit.

   【If lower limit value is set 】
   During operation mode except heating, you cannot set the value below the lower limit.

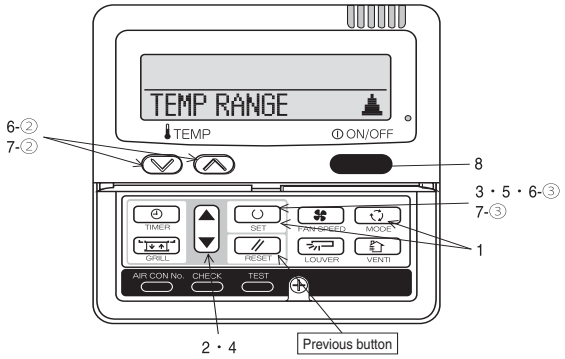
2. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "NO INDN CHANGE"
   【If upper limit value is set】
   During heating, even if the value exceeding the upper limit is set, upper limit value will be sent to the indoor unit. But, the indication is the same as the temperature set.

   【If lower limit value is set 】
   During except heating, even if the value lower than the lower limit is set, lower limit value will be sent to the indoor unit. But, the indication is the same as the temperature set.

●How to set upper and lower limit value

1. Stop the air-conditioner, and press (SET) and (MODE) button at the same time for over three seconds .
   The indication changes to "FUNCTION SET ▼".
2. Press ▼ button once, and change to the "TEMP RANGE ▲ " indication.
3. Press (SET) button, and enter the temperature range setting mode.
4. Select "UPPER LIMIT ▼" or "LOWER LIMIT ▲" by using ▲ ▼ button.
5. Press (SET) button to fix.
6. When "UPPER LIMIT ▼" is selected (valid during heating)
   ① Indication: " ∨ ∧ SET UP" → "UPPER 30˚C ∨"
   ② Select the upper limit value with temperature setting button ∨ ∧. Indication example: "UPPER 26˚C ∨ ∧" (blinking)
   ③ Press (SET) button to fix. Indication example: "UPPER 26˚C" (Displayed for two seconds)
   After the fixed upper limit value displayed for two seconds, the indication will return to "UPPER LIMIT ▼".
7. When "LOWER LIMIT ▲" is selected (valid during cooling, dry, fan, automatic)
   ① Indication: " ∨ ∧ SET UP" → "LOWER 18˚C ∧"
   ② Select the lower limit value with temperature setting button ∨ ∧. Indication example: "LOWER 24˚C ∨ ∧" (blinking)
   ③ Press (SET) button to fix. Indication for example: "LOWER 24˚C" (Displayed for two seconds)
   After the fixed lower limit value displayed for two seconds, the indication will return to "LOWER LIMIT ▼".
8. Press ON/OFF button to finish.

- It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
- During setting, if you press (RESET) button, you return to the previous screen.



The functional setting

●The initial function setting for typical using is performed automatically by the indoor unit connected, when remote controller and indoor unit are connected.
As long as they are used in a typical manner, there will be no need to change the initial settings.
If you would like to change the initial setting marked " ○ ", set your desired setting as for the selected item.
The procedure of functional setting is shown as the following diagram.

[Flow of function setting]

Start : Stop air-conditioner and press "(SET)" and "(MODE)" buttons at the same time for over three seconds.
Finalize : Press "(SET)" button.
Reset : Press "(RESET)" button.
Select : Press ▲ ▼ button.
End : Press ON/OFF button.
It is possible to finish above setting on the way, and unfinished change of setting is unavailable.
" ○ " : Initial settings
" ※ " : Automatic criterion

Record and keep the setting

Consult the technical data etc. for each control details

Stop air-conditioner and press (SET) + (MODE) buttons at the same time for over three seconds.

FUNCTION SET ▼

FUNCTION ▼ (Remote controller function)

	Function	setting		
01	GRILLE ↑↓ SET			
		↑↓ INVALID	○	
		50Hz ZONE ONLY		When you use at 50Hz area
		60Hz ZONE ONLY		When you use at 60Hz area
02	AUTO RUN SET			
		AUTO RUN ON	※	
		AUTO RUN OFF	※	Automatical operation is impossible
03	TEMP SW			
		VALID	○	
		INVALID		Temperature setting button is not working
04	MODE SW			
		VALID	○	
		INVALID		Mode button is not working
05	ON/OFF SW			
		VALID	○	
		INVALID		On/Off button is not working
06	FAN SPEED SW			
		VALID	※	
		INVALID	※	Fan speed button is not working
07	LOUVER SW			
		VALID	※	
		INVALID	※	Louver button is not working
08	TIMER SW			
		VALID	○	
		INVALID		Timer button is not working
09	SENSOR SET			
		SENSOR OFF	○	Remote thermistor is not working.
		SENSOR ON		Remote thermistor is working.
		SENSOR +3.0℃		Remote thermistor is working, and to be set for producing +3.0˚C increase in temperature.
		SENSOR +2.0℃		Remote thermistor is working, and to be set for producing +2.0˚C increase in temperature.
		SENSOR +1.0℃		Remote thermistor is working, and to be set for producing +1.0˚C increase in temperature.
		SENSOR -1.0℃		Remote thermistor is working, and to be set for producing -1.0˚C increase in temperature.
		SENSOR -2.0℃		Remote thermistor is working, and to be set for producing -2.0˚C increase in temperature.
		SENSOR -3.0℃		Remote thermistor is working, and to be set for producing -3.0˚C increase in temperature.
10	AUTO RESTART			
		INVALID	○	
		VALID		
11	VENT LINK SET			
		NO VENT	○	
		VENT LINK		In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), the operation of ventilation device is linked with the operation of indoor unit.
		NO VENT LINK		In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), you can operate /stop the ventilation device independently by (VENT) button.
12	TEMP RANGE SET			
		INDN CHANGE	○	If you change the range of set temperature, the indication of set temperature will vary following the control.
		NO INDN CHANGE		If you change the range of set temperature, the indication of set temperature will not vary following the control, and keep the set temperature.
13	I/U FAN			
		HI-MID-LO	※	Airflow of fan becomes of ※-※-※ or the four speed of ※-※-※-※.
		HI-LO	※	Airflow of fan becomes of ※-※.
		HI-MID		Airflow of fan becomes of ※-※.
		1 FAN SPEED	※	Airflow of fan is fixed at one speed.
14	POSITION			If you change the remote controller function "14 POSITION", you must change the indoor function "04 POSITION" accordingly.
		4POSITION STOP	○	You can select the louver stop position in the four.
		FREE STOP		The louver can stop at any position.
15	MODEL TYPE			
		HEAT PUMP	※	
		COOLING ONLY	※	
16	EXTERNAL CONTROL SET			
		INDIVIDUAL	○	If you input signal into CNT of the indoor printed circuit board from external, the indoor unit will be operated independently according to the input from external.
		FOR ALL UNITS		If you input into CNT of the indoor printed circuit board from external, all units which connect to the same remote controller are operated according to the input from external.
17	ROOM TEMP INDICATION SET			
		INDICATION OFF	○	
		INDICATION ON		In normal working indication, indoor unit temperature is indicated instead of airflow. (Only the master remote controller can be indicated.)
18	※ INDICATION			
		INDICATION ON	○	
		INDICATION OFF		Heating preparation indication should not be indicated.
19	℃/℉ SET			
		℃	○	Temperature indication is by degree C
		℉		Temperature indication is by degree F

ON/OFF button (finished)

Note 1: The initial setting marked "※" is decided by connected indoor and outdoor unit, and is automatically defined as following table.

Function No.	Item	Default	Model
Remote controller function02	AUTO RUN SET	AUTO RUN ON	"Auto-RUN" mode selectable indoor unit.
		AUTO RUN OFF	Indoor unit without "Auto-RUN" mode
Remote controller function06	FAN SPEED SW	VALID	Indoor unit with two or three step of air flow setting
		INVALID	Indoor unit with only one of air flow setting
Remote controller function07	LOUVER SW	VALID	Indoor unit with automatically swing louver
		INVALID	Indoor unit without automatically swing louver
Remote controller function13	I/U FAN	HI-MID-LO	Indoor unit with three step of air flow setting
		HI-LO	Indoor unit with two step of air flow setting
		HI-MID	
		1 FAN SPEED	Indoor unit with only one of air flow setting
Remote controller function15	MODEL TYPE	HEAT PUMP	Heat pump unit
		COOLING ONLY	Exclusive cooling unit

Note 3: As for plural indoor unit, set indoor functions to each master and slave indoor unit.
But only master indoor unit is received the setting change of indoor unit function "05 EXTERNAL INPUT" and "06 PERMISSION / PROHIBISHION".

(Indoor unit function) I/U FUNCTION ▲

Indoor unit No. are indicated only when plural indoor units are connected.

I/U000 ▲
I/U001 ≑
I/U002 ≑
I/U003 ≑
I/U004 ≑

Function	setting		
02 FAN SPEED SET	STANDARD	※	
	HIGH SPEED 1	※	
	HIGH SPEED 2		
03 FILTER SIGN SET	INDICATION OFF		
	TYPE 1	○	The filter sign is indicated after running for 180 hours.
	TYPE 2		The filter sign is indicated after running for 600 hours.
	TYPE 3		The filter sign is indicated after running for 1000 hours.
	TYPE 4		The filter sign is indicated after running for 1000 hours, then the indoor unit will be stopped by compulsion after 24 hours.
04 POSITION			If you change the indoor function "04 POSITION", you must change the remote controller function "14 POSITION" accordingly.
	4POSITION STOP	○	You can select the louver stop position in the four.
	FREE STOP		The louver can stop at any position.
05 EXTERNAL INPUT	LEVEL INPUT	○	
	PULSE INPUT		
06 OPERATION PERMISSION/PROHIBITION	INVALID	○	
	VALID		Permission/prohibition control of operation will be valid.
07 EMERGENCY STOP	INVALID	○	
	VALID		With the VRF series, it is used to stop all indoor units connected with the same outdoor unit immediately. When stop signal is inputed from remote on-off terminal "CNT-6", all indoor units are stopped immediately.
08 ※ SP OFFSET	OFFSET +3.0℃		To be reset for producing +3.0˚C increase in temperature during heating.
	OFFSET +2.0℃		To be reset for producing +2.0˚C increase in temperature during heating.
	OFFSET +1.0℃		To be reset for producing +1.0˚C increase in temperature during heating.
	NO OFFSET	○	
09 RETURN AIR TEMP	OFFSET +2.0℃		To be reset producing +2.0˚C increase in return air temperature of indoor unit.
	OFFSET +1.5℃		To be reset producing +1.5˚C increase in return air temperature of indoor unit.
	OFFSET +1.0℃		To be reset producing +1.0˚C increase in return air temperature of indoor unit.
	NO OFFSET	○	
	OFFSET -1.0℃		To be reset producing -1.0˚C increase in return air temperature of indoor unit.
	OFFSET -1.5℃		To be reset producing -1.5˚C increase in return air temperature of indoor unit.
	OFFSET -2.0℃		To be reset producing -2.0˚C increase in return air temperature of indoor unit.
10 ※ FAN CONTROL	LOW FAN SPEED	○	When heating thermostat is OFF, to be operated with low fan speed. (or with ultra low fan speed in case of some models)
	SET FAN SPEED		When heating thermostat is OFF, to be operated with set fan speed.
	INTERMITTENCE		When heating thermostat is OFF, fan speed is operated intermittently.
	FAN OFF		When heating thermostat is OFF, the fan is stopped. When the remote thermistor is working, "FAN OFF" is set automatically. Do not set "FAN OFF" when the indoor unit's thermistor is working.
11 FROST PREVENTION TEMP			Change of indoor heat exchanger temperature to start frost prevention control.
	TEMP HIGH		
	TEMP LOW	○	
12 FROST PREVENTION CONTROL			Working only with the Single split series.
	FAN CONTROL ON	○	To control frost prevention, the indoor fan tap is raised.
	FAN CONTROL OFF		
13 DRAIN PUMP LINK			
	❄◇	○	Drain pump is run during cooling and dry.
	❄◇ AND ※		Drain pump is run during cooling, dry and heating.
	❄◇ AND ※ AND ≋		Drain pump is run during cooling, dry, heating and fan.
	❄◇ AND ≋		Drain pump is run during cooling, dry and fan.
14 ❄ FAN REMAINING			
	NO REMAINING	○	After cooling is stopped or cooling thermostat is OFF, the fan does not perform extra operation.
	0.5 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for half an hour.
	1 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for an hour.
	6 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for six hours.
15 ※ FAN REMAINING			
	NO REMAINING	○	After heating is stopped or heating thermostat is OFF, the fan does not perform extra operation.
	0.5 HOUR		After heating is stopped or heating thermostat is OFF,the fan perform extra operation for half an hour.
	2 HOUR		After heating is stopped or heating thermostat is OFF,the fan perform extra operation for two hours.
	6 HOUR		After heating is stopped or heating thermostat is OFF, the fan perform extra operation for six hours.
16 ※ FAN INTERMITTENCE			
	NO REMAINING	○	
	20minOFF 5minON		During heating is stopped or heating thermostat is OFF, the fan perform intermittent operation for five minutes with low fan speed after twenty minutes' OFF.
	5minOFF 5minON		During heating is stopped or heating thermostat is OFF, the fan perform intermittent operation for five minutes with low fan speed after five minutes' OFF.
17 PRESSURE CONTROL			
	STANDARD	※	
	TYPE1	※	Connected "OA Processing" type indoor unit, and is automatically defined.

Note2: Fan setting of "HIGH SPEED"

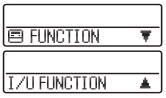
Fan tap		Indoor unit air flow setting			
		❄❄ - ❄❄ - ❄❄ - ❄	❄❄ - ❄❄ - ❄	❄❄ - ❄	❄❄ - ❄❄
FAN SPEED SET	STANDARD	PHi - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me
	HIGH SPEED1, 2	PHi - PHi - Hi - Me	PHi - Hi - Me	PHi - Me	PHi - Hi

Initial function setting of some indoor unit is "HIGH SPEED".
4 speed is not able to be set with wireless remote controller or simple remote controller (RCH-H3).

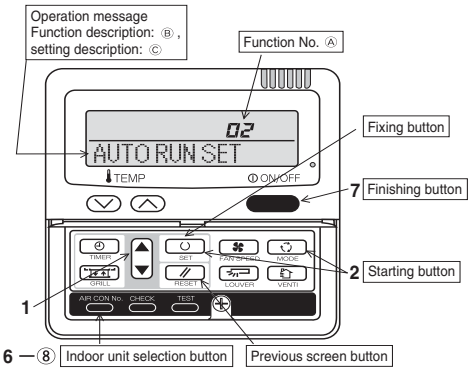
How to set function

1. **Stop air-conditioner and press (SET) (MODE) buttons at the same time for over three seconds, and the "FUNCTION SET ▼" will be displayed.**

2. **Press (SET) button.**
3. **Make sure which do you want to set, "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).**
4. **Press ▲ or ▼ button.**
   Selecct "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).



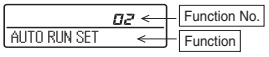
5. **Press (SET) button.**



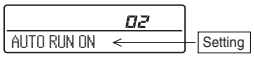
6. **【On the occasion of remote controller function selection】**

① "DATA LOADING" (Indication with blinking)
↓
Display is changed to "01 GRILLE ↑↓SET".

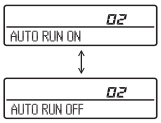
② Press ▲ or ▼ button.
"No. and function"are indicated by turns on the remote controller function table, then you can select from them.
(For example)



③ Press (SET) button.
The current setting of selected function is indicated.
(for example) "AUTO RUN ON" ← If "02 AUTO RUN SET" is selected



④ Press ▲ or ▼ button.
Select the setting.



⑤ Press (SET)
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, Set as the same procedure if you want to set continuously ,and if to finish, go to 7.

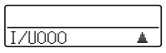
7. **Press ON/OFF button.**
   Setting is finished.

【On the occasion of indoor unit function selection】

① "DATA LOADING" (Blinking for 2 to 23 seconds to read the data)
↓
Indication is changed to "02 FAN SPEED SET".
Go to ②.

[Note]

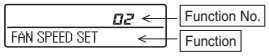
(1) If plural indoor units are connected to a remote controller, the indication is "I/U 000" (blinking) ← The lowest number of the indoor unit connected is indicated.



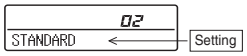
(2) Press ▲ or ▼ button.
Select the number of the indoor unit you are to set
If you select "ALL UNIT ▼", you can set the same setting with all unites.

(3) Press (SET) button.

② Press ▲ or ▼ button.
"No. and function" are indicated by turns on the indoor unit function table, then you can select from them.
(For example)



③ Press (SET) button.
The current setting of selected function is indicated.
(For example) "STANDARD" ← If "02 FAN SPEED SET" is selected.



④ Press ▲ or ▼ button.
Select the setting.

⑤ Press (SET) button.
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, set as the same procedure if you want to set continuously , and if to finish, go to 7.

※ When plural indoor units are connected to a remote controller, press the AIRCON NO. button, which allows you to go back to the indoor unit selection screen. (example "I/U 000 ▲")

- It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
- During setting, if you press (RESET) button, you return to the previous screen.
- Setting is memorized in the controller and it is saved independently of power failure.

【How to check the current setting】

When you select from "No. and funcion" and press set button by the previous operation, the "Setting" displayed first is the current setting.
(But, if you select "ALL UNIT ▼", the setting of the lowest number indoor unit is displayed.)

12.2 Wireles kit (FDTC series : RCN-TC-24W-ER)

PJA012D758

Notes :
Following functions of FDTC Type-D indoor unit series are not able to be set with this wireess remote controller (RCN-TC-24W-ER).
1. Individual flap control system
2. 4-fan speed setting (PHi/Hi/Me/Lo) → 3-fan speed setting (Hi/Me/Lo)

⚠ WARNING

- Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connection or hold will cause abnormal heat generation or fire.
- Make sure the power supply is turned off when electric wiring work.
  Otherwise, electric shock, malfunction and improper running may occur.

⚠ CAUTION

- DO NOT install the wireless kit at the following places in order to avoid malfunction.
  (1) Places exposed to direct sunlight
  (2) Places near heat devices
  (3) High humidity places
  (4) Hot surface or cold surface enough to generate condensation
  (5) Places exposed to oil mist or steam directly
  (6) Uneven surface
  (7) Places affected by the direct airflow of the AC unit.
  (8) Places where the receiver is influenced by the fluorescent lamp (especially inverter type) or sunlight.
  (9) Places where the receiver is affected by infrared rays of any other communication devices
  (10) Places where some object may obstruct the communication with the remote controller
- DO NOT leave the wireless kit without the cover.
  In case the cover needs to be detached, protect the receiver with a packaging box or bag in order to keep it away from water and dust.

Note

- Instruct the customer how to operate it correctly referring to the instruction manual.
- For the installation method of the air conditioner itself, refer to the installation manual enclosed in the package.

① Accessories

Please make sure that you have all of the following accessories.

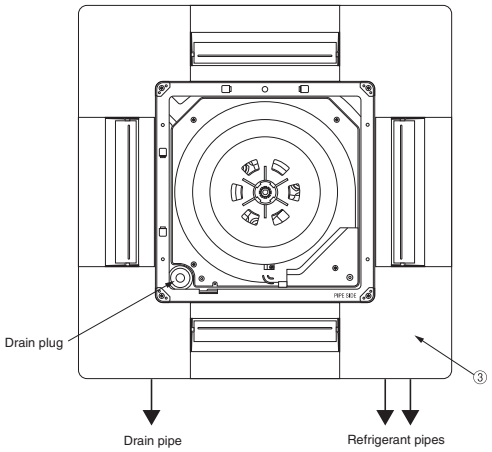
Receiver		1	Remote controller holder		1
Wireless remote controller		1	Wood screw for holder		2
Parts set		1	AAA dry cell battery (RO3)		2

② How to install the receiver

The receiver can be installed by replacing with a corner panel on the applicable decorative panel.

Preparation before installation

① Attach the decorative panel onto the air conditioner according to the installation manual for the panel.
② Remove the air return grille.
③ Remove a corner panel located on the refrigerant pipes side.
④ Remove two screws and detach the lid from the control box of the air conditioner.



Setting on site

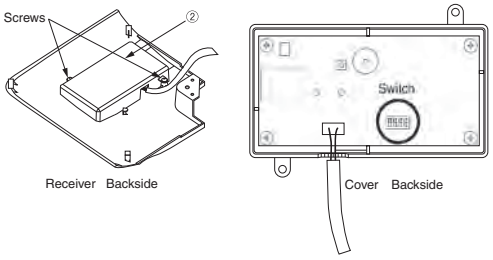
① PCB on the receiver has the following switches to set the functions. Default setting is shown with ☐ mark.

S W 1	Customized signal setting to avoid mixed communication	☐ ON : Normal OFF : Remote
S W 2	Receiver master/slave setting	☐ ON : Master OFF : Slave
S W 3	Buzzer valid/Invalid	☐ ON : Valid OFF : Invalid
S W 4	Auto restart	ON : Valid ☐ OFF : Invalid

<To change the settings>

② Remove the cover by unscrewing two screws from the back of receiver.
③ Change the setting by the switch on PCB.

Default settings



④ When SW1 is turned to OFF position, change the corresponding remote controller setting as follows:

How to change the remote controller setting

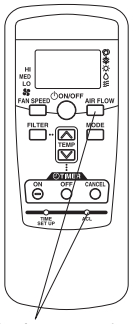
Pressing ACL switch with AIR FLOW button kept pressing or inserting the batteries with pressing AIR FLOW button will customize the signal.

Note

※ When the batteries are removed, the setting will return to the default setting.
Please make sure to reset it when the batteries are replaced.

Caution

Instruct the customer to set the mentioned above when replacing the batteries.
(How to set is also mentioned in the user's manual attached on the air conditioner.)

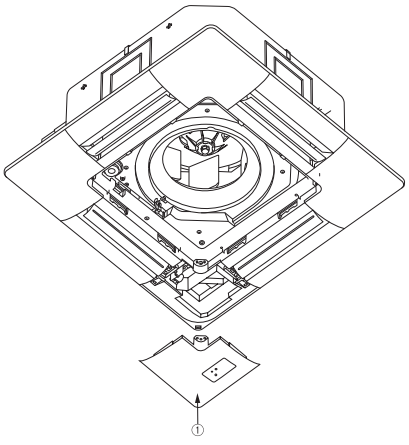


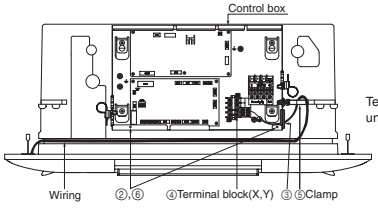
Radio interference prevention mode

Installation of the receiver

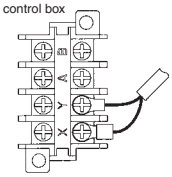
① Attach the receiver to the panel according to the panel installation manual.
② Remove two screws and detach the lid from the control box.
③ Put the wiring in the control box with other wiring as shown below.
④ Connect the wiring to the terminal block (X,Y) provided in the control box.(Non-polarized)
⑤ Fix the wiring with the clamp as shown below.
⑥ Reattach the control box lid with 2 screws removed.

※ Note: Make sure wires not to be pinched by any other parts like panel and control box.





Terminal block (X,Y) in the indoor unit control box

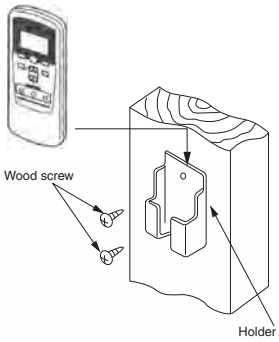


③ Remote controller

Installation of the controller holder

Caution

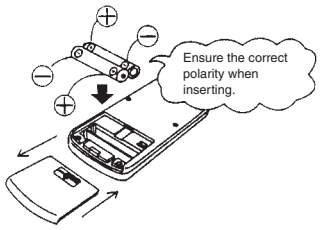
DO NOT install it on the following places
1. Places exposed to direct sunlight
2. Places near heat devices
3. High humidity places
4. Hot surface or cold surface enough to generate condensation
5. Places exposed to oil mist or steam directly.
6. Uneven surface



Installation tips for the remote controller holder
- Adjust and keep the holder upright
- Tighten the screw to the end to avoid scratching the remote controller.
- DO NOT attach the holder on plaster wall.

How to insert batteries

① Detach the back lid.
② Insert the batteries. (two AAA batteries)
③ Reattach the back lid.

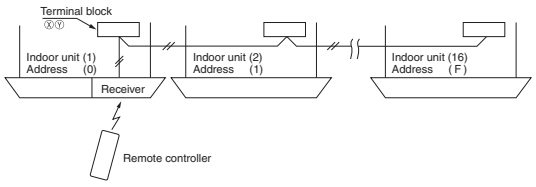


Control plural indoor units with one remote controller

Up to 16 indoor units can be connected.
① Connect the XY terminal with 2-core wire. As for the size, refer to the following note.
② For Single packaged air conditioner series, set the indoor unit address with SW2 on the indoor unit PCB from [0] to [F] so as not to duplicate.

Restrictions on the thickness and length of wire
(Maximun total extension 600m.)

Standard	Within 100m x 0.3 mm^2
	Within 200m x 0.5 mm^2
	Within 300m x 0.75mm^2
	Within 400m x 1.25mm^2
	Within 600m x 2.0 mm^2



③ For VRF series, set the indoor unit address with SW1, SW2 and SW5-2 on the indoor unit PCB from [000] to [127] so as not to duplicate.

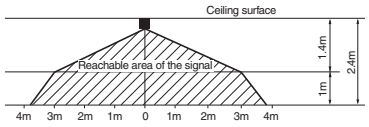
Master/Slave setting when using plural remote controllers

Up to two receivers can be installed in one indoor unit group.
When two receivers are used, it is necessary for a receiver to turn OFF SW2 on the receiver PCB to set it as slave.

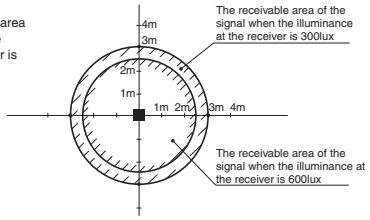
(For the method of switching, please see **Setting on site** in the section of **② How to install the receiver** in this manual.)

Wireless remote controller's operable area

① Standard reachable area of the signal
[condition] Illuminance at the receiver: 300lux
(when no lighting is installed within 1m of the receiver in an ordinary office.)



② Correlation between illuminance at the receiver and reachable area of the signal in a plain view.
The drawing in the right shows the correlation between the reachable area of the signal and illuminance at the receiver when the remote controller is operated at 1m high under the condition of ceiling height of 2.4m.


4m
3m
2m
1m
1m 2m 3m 4m
The receivable area of the signal when the illuminance at the receiver is 300lux
The receivable area of the signal when the illuminance at the receiver is 600lux

③ Installation tips when several receivers are installed close
Minimum distance between the indoor units which can avoid cross communication is 5m under the condition of 300lux of illuminance at the receiver.
(When no lighting is installed within 1m of the receiver in an ordinary office)

④ How to disable the Auto mode operation

VRF series (except heat recovery 3-pipe systems) cannot be operated in Auto mode.
Make sure to set the remote controller for the models so as not to be able to choose Auto mode.

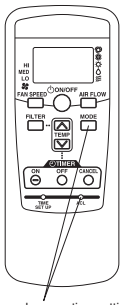
Pressing ACL switch with MODE button kept pressing or inserting the batteries with pressing MODE button will make auto mode operation.

Note

※ When the batteries are removed, the setting will return to the default setting (Auto mode is valid).

Caution

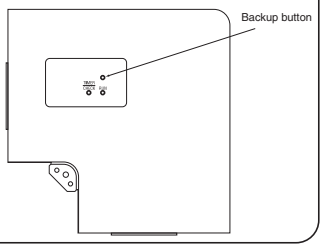
Instruct the customer to set the mentioned above when replacing the batteries. (How to set is also mentioned in the user's manual attached on the air conditioner.)



Auto mode operation setting

⑤ Backup button

A Backup button is provided on the receiver. Even when the operation from the wireless remote controller is not possible (due to flat batteries, controller lost, or controller failure), still it possible to operate as temporary means. Press the button directly when operating it.
(1) The air conditioner starts the operation with the condition of Auto mode, 23˚C of set point, High fan speed and horizontal louver position.
(2) The air conditioner stops the operation when the button is pressed when in operation.



⑥ Cooling test run operation

- After safety confirmation, turn on the power.
- Transmit a cooling operation command with wireless remote controller, while the backup button on the receiver is pressed.
- If the backup button on the receiver is pressed during a test run, it will end the test run.
- If you cannot operate the unit properly during a test run, please check by consulting with inspection guides on the wiring diagram of outdoor units.

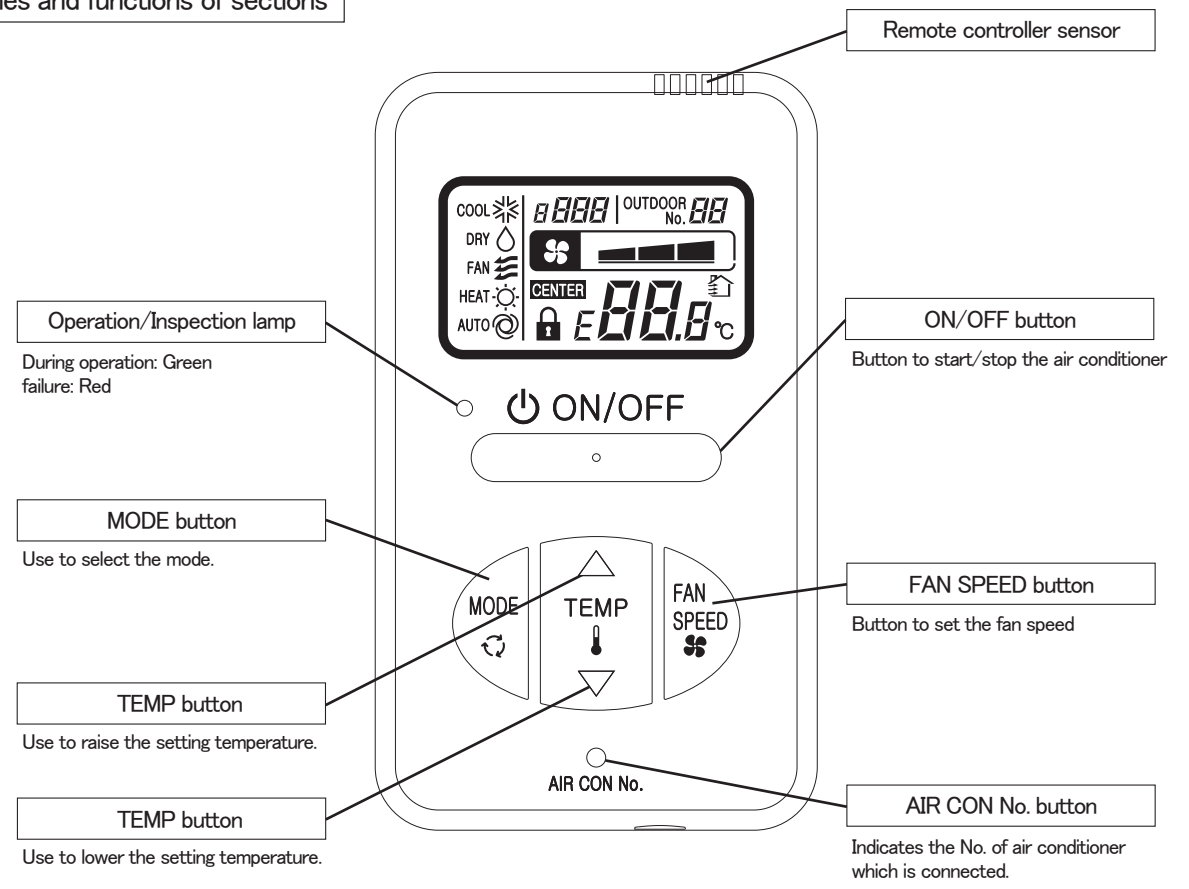
⑦ How to read the two-digit display

On the receiver of a wireless kit, a two-digit (7-segment) display is provided.
(1) An indication will be displayed for one hour after power on.
(2) An indication will be displayed for 3.5 seconds after transmitting a "STOP" command from the wireless remote controller or the operation of the backup button to stop the unit.
(3) An indication appearing in (1) or (2) above will go off as soon as the unit starts operation.
(4) When there are no error records to indicate, addresses of all the connected units are displayed.
(5) When there are some error records remaining, the error records are displayed.
(6) Error records can be cleared by transmitting a "STOP" command from the wireless remote controller, while the backup button is pressed.

12.3 Simple wired remote controller (FDTC series : RCH-E3)

Notes :
Following functions of Type-D indoor unit series are not able to be set with this simple wired remote controller (RCH-E3).
1. Individual flap control system (for FDTC)
2. 4-fan speed setting (PHi/Hi/Me/Lo) → 3-fan speed setting (Hi/Me/Lo) (for FDTC)

Names and functions of sections



Operation/Inspection lamp
During operation: Green
failure: Red

ON/OFF button
Button to start/stop the air conditioner

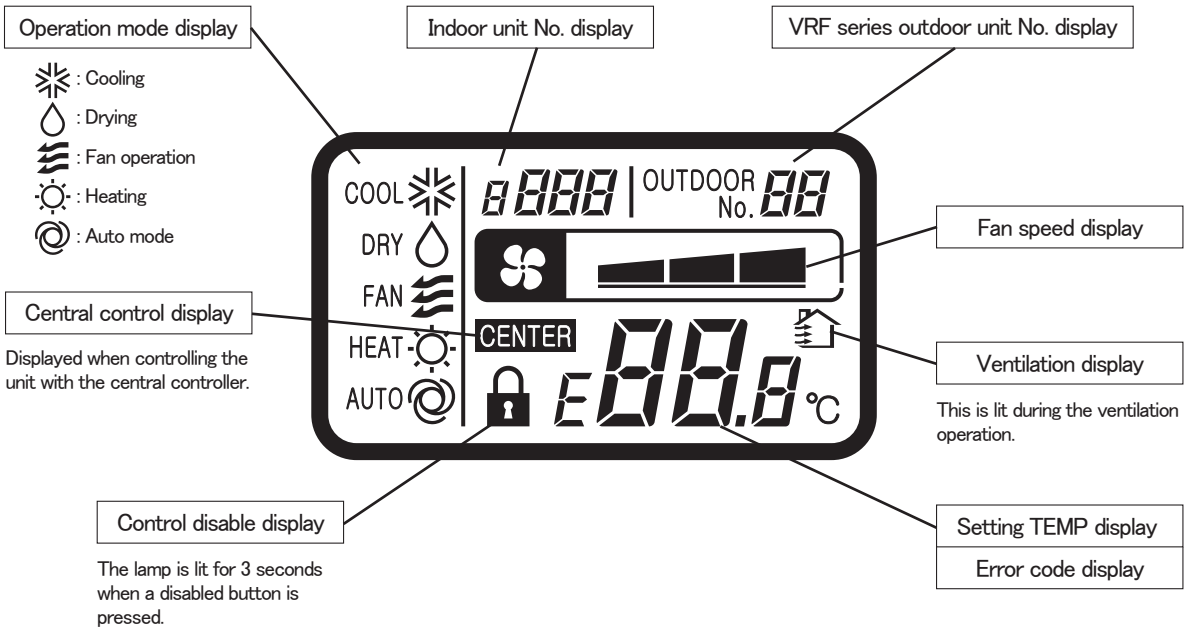
MODE button
Use to select the mode.

FAN SPEED button
Button to set the fan speed

TEMP button
Use to raise the setting temperature.

TEMP button
Use to lower the setting temperature.

AIR CON No. button
Indicates the No. of air conditioner which is connected.



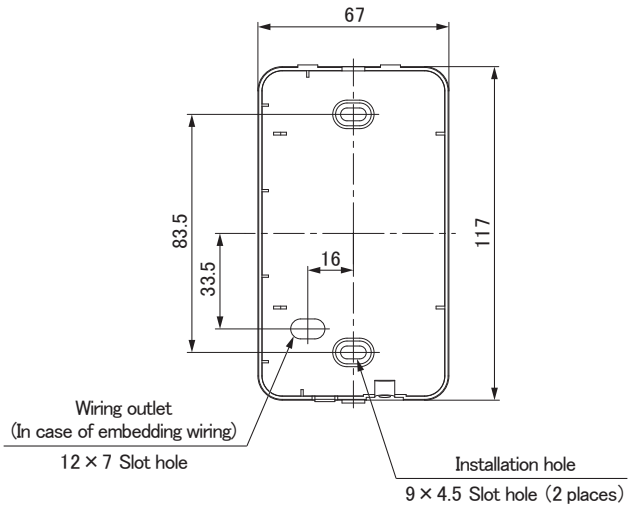
Installation of remote controller

DO NOT install the remote controller at the following places in order to avoid malfunction.

(1) Places exposed to direct sunlight
(2) Places near heat devices
(3) High humidity places
(4) Hot surface or cold surface enough to generate condensation
(5) Places exposed to oil mist or steam directly
(6) Uneven surface

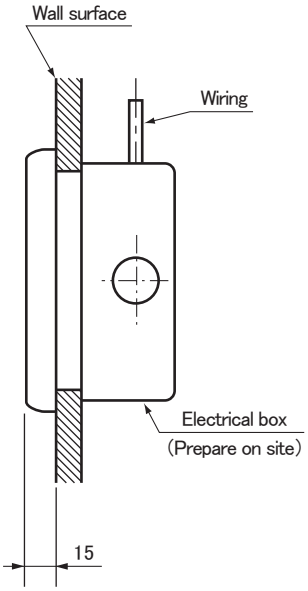
PJZ000Z272

Remote control installation dimensions

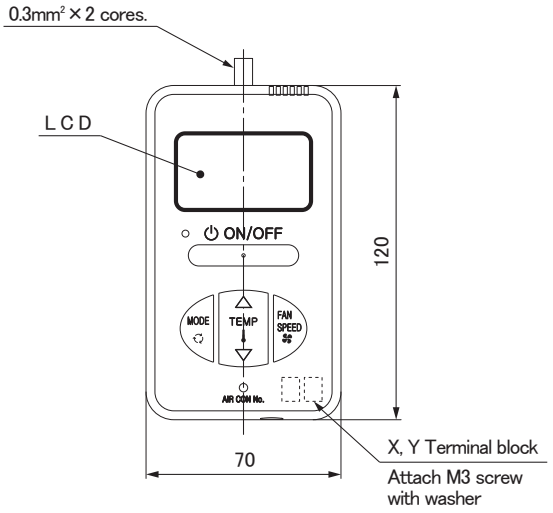


Note: Installation screw for remote controller
M4 Screw (2 pieces)

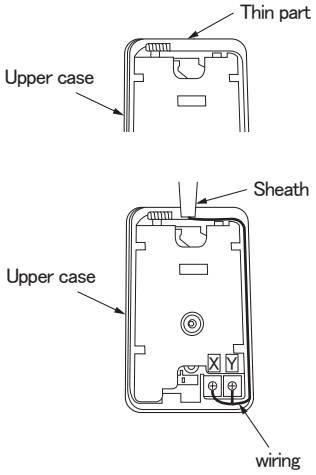
In case of embedding wiring



In case of exposing wiring

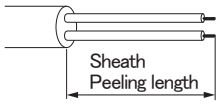


The remote controller wiring can be extracted from the upper center. After the thin part in the upper side of the remote controller upper case is scraped with a nipper or knife, remove burr with a file.



The peeling length of each wiring is as follows:

X wiring : 160mm Y wiring : 150mm



Wiring specifications

(1) Wiring of remote controller should use 0.3mm² × 2 core wires or cables. (on-site configuration)
(2) Maximum prolongation of remote controller wiring is 600m.
If the prolongation is over 100m, change to the size below.
But, the wiring in the remote controller case should be 0.3mm² (recommended) to 0.5mm².
Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire
connecting section. Be careful about contact failure.

Unit:mm

Length	Wiring thickness
100 to 200m	0.5mm² × 2 cores
Under 300m	0.75mm² × 2 cores
Under 400m	1.25mm² × 2 cores
Under 600m	2.0mm² × 2 cores

Adapted to **RoHS** directive

Simple Remote Controller Installation Manual

PJZ012D069

Read together with indoor unit's installation manual.

⚠WARNING

- **Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal.**
  Loose connection or hold will cause abnormal heat generation or fire.
- **Make sure the power supply is turned off when electric wiring work.**
  Otherwise, electric shock, malfunction and improper running may occur.

⚠ CAUTION

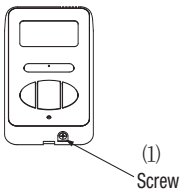
- **DO NOT install the remote controller at the following places in order to avoid malfunction.**
  (1) Places exposed to direct sunlight
  (2) Places near heat devices
  (3) High humidity places
  (4) Hot surface or cold surface enough to generate condensation
  (5) Places exposed to oil mist or steam directly
  (6) Uneven surface
- **DO NOT leave the remote controller without the upper case.**
  In case the upper cace needs to be detached, protect the remote controller with a packaging box or bag in order to keep it away from water and dust.

Accessories	Remote controller, wood screw (ϕ3.5×16) 2 pieces
Prepare on site	Remote controller cord (2 cores) (Refer to [2. Installation and wiring of remote controller]) [In case of embedding cord] Electrical box, M4 screw (2 pieces) [In case of exposing cord] Cord clamp (if needed)

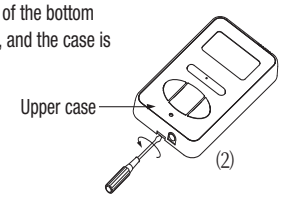
1. Installation procedure

In case of embedding cord

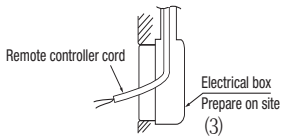
(1) Make certain to remove the screw on the bottom surface of the remote controller.



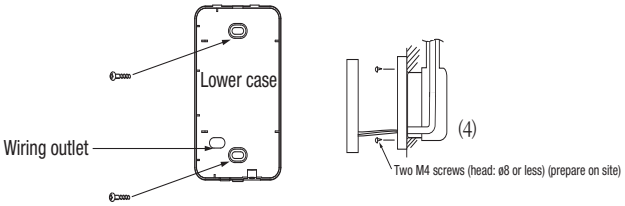
(2) Remove the upper case of the remote controller.
Insert a flat-blade screwdriver to a concave portion of the bottom surface of the remote controller and slightly twist it, and the case is removed.



(3) Pre-bury the electrical box and remote controller cord.



(4) Prepare two M4 screws (recommended length: 12 – 16mm), and install the lower case to the electrical box.
Do not use a screw whose screw head is larger than the height of the wall around the screw hole.

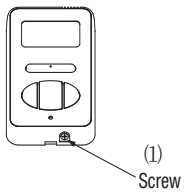


(5) Connect the remote controller cord to the terminal block.
Connect the terminals (X and Y) of the remote controller and the terminals (X and Y) of the indoor unit. (No polarity of X and Y)

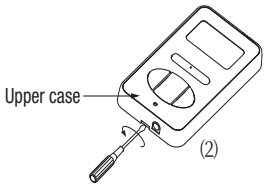
(6) Mount the upper case for restoring to its former state so as not to crimp the remote controller cord, and secure with the removed screw.

In case of exposing cord

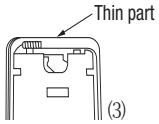
(1) Make certain to remove a screw on the bottom surface of the remote controller.



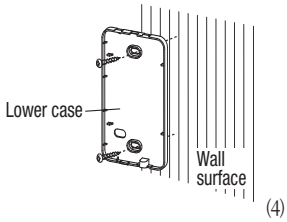
(2) Remove the upper case of the remote controller.
Insert a flat-blade screwdriver to a concave portion of the bottom surface of the remote control and slightly twist it, and the case is removed.



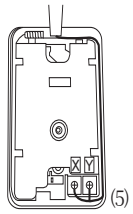
(3) The remote controller cord can be extracted from the upper center.
After the thin part in the upper side of the remote controller upper case is scraped with a nipper or knife, remove burr with a file.



(4) The lower case of the remote controller is mounted to a flat wall with two accessory wood screws.

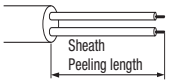


(5) Connect the remote controller cord to the terminal block.
Connect the terminals (X and Y) of the remote controller and the terminals (X and Y) of the indoor unit. (No polarity of X and Y)
The wiring route is as shown in the right.



The wiring in the remote controller case should be 0.3 mm^2 (recommended) to 0.5 mm^2 at maximum.
Further, peel off the sheath.
The peeling length of each wiring is as follows:

X wiring : 160mm
Y wiring : 150mm



(6) Mount the upper case for restoring to its former state so as not to crimp the remote controller cord, and secure with the removed screw.

(7) In the case of exposing installation, secure the remote controller cord to the wall surface with a cord clamp so as not to loosen the remote controller cord.

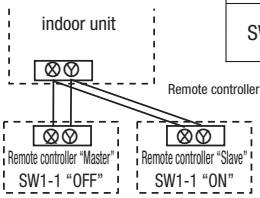
2. Installation and wiring of remote controller

(1) Wiring of remote controller should use 0.3mm^2 × 2 core wires or cables. (on-site configuration)
(2) Maximum prolongation of remote controller wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, the wiring in the remote controller case should be 0.3mm^2 (recommended) to 0.5mm^2.
Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire
connecting section. Be careful about contact failure.
100 - 200m·····0.5mm^2 × 2 cores
Under 300m·····0.75mm^2 × 2 cores
Under 400m·····1.25mm^2 × 2 cores
Under 600m·····2.0mm^2 × 2 cores

3. Master/ slave setting when more than one remote controller are used

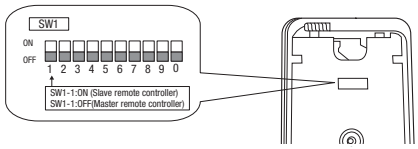
(1) Up to two remote controllers can be connected to one unit (or one group) of indoor unit.

Switch	Setting	Function detail
SW1-1	ON	Slave remote controller
	OFF	Master remote controller



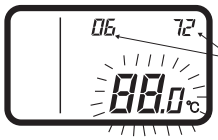
(2) Set the switch SW1-1 of the slave remote controller is "Slave" (ON). The factory default is set as "Master" (OFF).

(Note) • The remote controller thermistor enabled setting can be set only to the master remote controller.
• Install the master remote controller at the position to detect room temperature.
• The air conditioner operation follows the last operation of the remote controller in case of the master / slave setting.



4. The indication when power source is supplied

(1) At the time of turning the power source on, after the light is on for the first 2 seconds, the display becomes as shown below.
The number displayed on the upper side of LCD in the remote control is the software number, and this is not an error code.



Software number
(The number in the left is one example. Another number may be shown.)

(2) Then, "88.0 °C" blinks on the remote controller until the communication between the remote controller and the indoor unit is established.

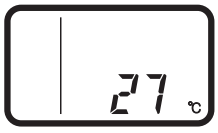
(3) In the case of connecting one remote controller with one unit (or one group) of indoor unit, make certain to set the master remote controller (factory default).
If the slave remote control is set, a communication cannot be established.

(4) If a state where the communication between the remote controller and the indoor unit cannot be established continues about for 30 minutes, "E" is displayed. Confirm the wiring of the indoor unit and the outdoor unit and master/slave setting of the remote controller.

5. Confirmation method for return air temperature

Return air temperature can be confirmed by the remote controller operation.

(1) **Press AIR CON NO. button for over 5 seconds.**
"88" blinks on the temperature setting indicator.
("88" blinks for approximately 2 seconds while data is read.)
↓
Then, the return air temperature is displayed.
(Example) return air temperature: "27 °C" (blinking)

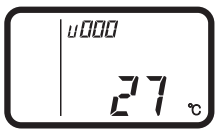


(Note) For the return air temperature, in the normal case, the return air temperature of the indoor unit is displayed; however, in the case that the remote control thermistor is effective, detected temperature by the remote controller thermistor is displayed.

(2) **Press ⏻ ON/OFF button.**
End.

[In the case that the remote thermistor is ineffective and plural indoor units are connected to one remote controller]

(1) **Press AIR CON NO. button for over 5 seconds.**
indoor unit No. indicator: "U 000" (blinking)
(Among the connected indoor units, the lowest number is displayed.)



(2) **Press TEMP△ or TEMP▽ button.**
Select the indoor unit No.

(3) **Press MODE button.**
Dectder the indoor unit No.
(Example) indoor unit No. indicator: "U 000"
"88" blinks on the temperature setting indicator. (blinking for approximately 2 to 10 seconds while data is read) Then, the return air temperature is displayed. When AIR CON NO. is pressed, return to the indoor unit selection display (example, "U 000").

(4) **Press ⏻ ON/OFF button.**
End.

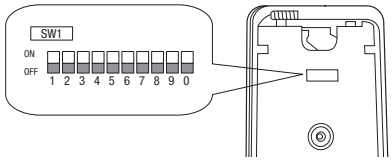
6. Function setting

Each function of the remote controller and the indoor unit is automatically set to the initial setting, which is the standard use, on the occasion of connecting the remote controller with the indoor unit. In the case of the standard use, the setting change is unnecessary. However, if you whould like to change the initial setting " ○ ", change the setting for only the item of the function number. **Record the setting contents and stored them.**

(1) Function setting item by switch on PCB

Switch No.	Setting	Setting detail	Initial setting
SW1-1	ON	Slave remote controller	
	OFF	Master remote controller	○
SW1-2	ON	Remote controller thermistor enabled	
	OFF	Remote controller thermistor disabled	○
SW1-3	ON	"MODE" button prohibited	
	OFF	"MODE" button enabled	○
SW1-4	ON	"ON/OFF" button prohibited	
	OFF	"ON/OFF" button enabled	○

Switch No.	Setting	Setting detail	Initial setting
SW1-5	ON	"TEMP" button prohibited	
	OFF	"TEMP" button enabled	○
SW1-6	ON	"FAN SPEED" button prohibited	※ Note 1
	OFF	"FAN SPEED" button enabled	※ Note 1
SW1-7	ON	Auto restart function enabled	
	OFF	Auto restart function disabled	○
SW1-8, 9, 0	ON	Not used	
	OFF		



- As for the slave remote controller, function setting is impossible other than SW1-1.
- In the indoor unit with only one fan speed, "FAN SPEED" button cannot be enabled.

(2) Function setting item by button operation

Classification	Function No.	Function	Setting No.	Setting	Initial setting	Remarks
Remote controller function	01	Indoor unit fan speed	01	Fan speed: three steps	※ Note 1	The fan speed is three steps, ❋ ■■■ - ❋ ■■ - ❋ ■ .
			02	Fan speed: two steps (Hi-Lo)	※ Note 1	The fan speed is two steps, ❋ ■■■ - ❋ ■ .
			03	Fan speed: two steps (Hi-Me)		The fan speed is two steps, ❋ ■■■ - ❋ ■■ .
			04	Fan: one step	※ Note 1	The fan speed is fixed to one step.
	03	Remote controller thermistor at the time of cooling	01	Remote controller thermistor: no offset	○	
			02	Remote controller thermistor: +3.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at +3.0°C.
			03	Remote controller thermistor: +2.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at +2.0°C.
			04	Remote controller thermistor: +1.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at +1.0°C.
			05	Remote controller thermistor: -1.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at -1.0°C.
			06	Remote controller thermistor: -2.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at -2.0°C.
			07	Remote controller thermistor: -3.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offsett temperature at -3.0°C.
	04	Remote controller thermistor at the time of heating	01	Remote controller thermistor: no offset	○	
			02	Remote controller thermistor: +3.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at +3.0°C.
			03	Remote controller thermistor: +2.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at +2.0°C.
			04	Remote controller thermistor: +1.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at +1.0°C.
			05	Remote controller thermistor: -1.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at -1.0°C.
			06	Remote controller thermistor: -2.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at -2.0°C.
			07	Remote controller thermistor: -3.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at -3.0°C.
	05	Ventilation setting	01	No ventilator connection	○	
			02	Ventilator links air-conditioner		In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), the operation of ventilation device is linked with the operation of indoor unit.
	06	"Auto" operation setting	01	"Auto" operation enabled	※ Note 1	
			02	"Auto" operation disabled	※ Note 1	"Auto" operation disabled
Indoor unit function	07	Operation permission/ prohibition	01	Disabled	○	
			02	Enabled		Operation permission/prohibition controller is enabled.
	08	External input	01	Level input	○	
			02	Pulse input		
	09	Fan speed setting	01	Standard	Note2	
			02	High speed 1	Note2	
			03	High speed 2	Note2	
	10	Fan remaining operation at the time of cooling	01	No remaining operation	○	After cooling stopped, no fan remaining operation
			02	0.5 hours		After cooling stopped, fan remaining operation for 0.5 hours
			03	1 hour		After cooling stopped, fan remaining operation for 1 hour
			04	6 hours		After cooling stopped, fan remaining operation for 6 hours
	11	Fan remaining operation at the time of heating	01	No remaining operation	○	After heating stopped or after heating thermostat OFF, no fan remaining operation
			02	0.5 hours		After heating stopped or after heating thermostat OFF, fan remaining operation for 0.5 hours
			03	2 hours		After heating stopped or after heating thermostat OFF, fan remaining operation for 2 hours
			04	6 hours		After heating stopped or after heating thermostat OFF, fan remaining operation for 6 hours
	12	Setting temperature offset at the time of heating	01	No offset	○	
			02	Setting temperature offset + 3.0 °C		The setting temperature at the time of heating is offset by +3.0 °C.
			03	Setting temperature offset + 2.0 °C		The setting temperature at the time of heating is offset by +2.0 °C.
			04	Setting temperature offset + 1.0 °C		The setting temperature at the time of heating is offset by +1.0 °C.
	13	Heating fan controller	01	Low fan speed	※ Note 1	At the time of heating thermostat OFF, operate with low fan speed.
			02	Setting fan speed		At the time of heating thermostat OFF, operate with the setting fan speed.
			03	Intermittent operation	※ Note 1	At the time of heatingr thermostat OFF, intermittently operate.
			04	Fan off		At the time of heating thermostat OFF, a fan will be stopped. When the remote controller thermistor is enabled, automatically set to "Fan off". Do not set at the time of the indoor unit thermistor.
	14	Return air temperature offset	01	No offset	○	
			02	Return air temperature offset +2.0 °C		Offset the return air temperature of the indoor unit by +2.0 °C.
			03	Return air temperature offset +1.5 °C		Offset the return air temperature of the indoor unit by +1.5 °C.
			04	Return air temperature offset +1.0 °C		Offset the return air temperature of the indoor unit by +1.0 °C.
			05	Return air temperature offset -1.0 °C		Offset the return air temperature of the indoor unit by -1.0 °C.
			06	Return air temperature offset -1.5 °C		Offset the return air temperature of the indoor unit by -1.5 °C.
			07	Return air temperature offset -2.0 °C		Offset the return air temperature of the indoor unit by -2.0 °C.

Note 1: The symbol " ※ " in the initial setting varies depending upon the indoor unit and the outdoor unit to be connected, and this is automatically determined as follows:

Swith No. Function No.	Function	Setting	Product model
SW1-6	"FAN SPEED" button	"FAN SPEED" button prohibited	Product model whose indoor fan speed is only one step
		"FAN SPEED" button enabled	Product model whose indoor fan speed is two steps or three steps
Remote controller function 01	Indoor unit fan speed	Fan speed: three steps	Product model whose indoor unit fan speed is three steps
		Fan speed: two steps (Hi-Lo)	Product model whose indoor unit fan speed is two steps
		Fan speed: two steps (Hi-Me)	
		Fan: one step	Product model whose indoor unit fan speed is only one step
Remote controller function 06	"Auto" operation setting	"Auto" operation enabled	Product model where "Auto" mode is selectable
		"Auto" operation disabled	Product model without "Auto" mode
Indoor unit function 13	Heating fan control	Low fan speed	Product model except FDUS
		Intermittent operation	FDUS

Note 2: Fan speed of "High speed" setting

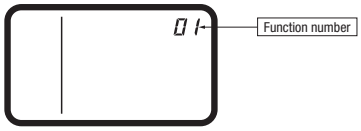
Fan speed setting	Indoor unit fan speed setting		
	❋ ■■■ - ❋ ■■ - ❋ ■	❋ ■■■ - ❋ ■	❋ ■■■ - ❋ ■■
Standard	Hi — Mid — Lo	Hi — Lo	Hi — Mid
High speed 1・2	UHi — Hi — Mid	UHi — Mid	UHi — Hi

Initial setting of some indoor unit is "High speed".

Note 3: As for plural indoor unit, set indoor functions to each master and slave indoor unit.
But only master indoor unit is received the setting change of indoor unit function "07 Operation permission/ prohibition" and "08 External input".

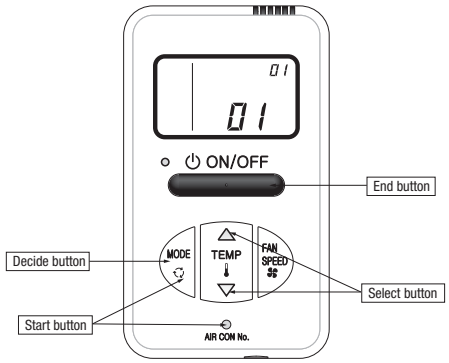
7. How to set functions by button operation

(1) **Stop air-conditioning, and simultaneously press AIR CON NO. and MODE buttons at the same time for over three seconds.**
The function number "01" blinks in the upper right.

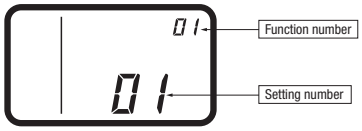


(2) **Press TEMP△ or TEMP▽ button.**
Select the function number.

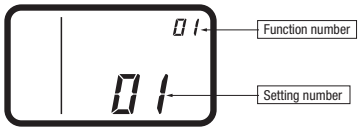
(3) **Press MODE button.**
Decide the function number.



(4) **[In the case of selecting the remote controller function (01-06)]**
① The current setting number of the selected function number blinks
(Example)
Function number: "01" (lighting)
Setting number: "01" (blinking)



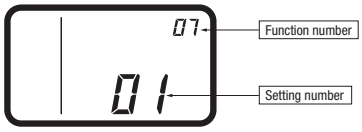
② **Press TEMP△ or TEMP▽ button.**
Select the setting number.
③ **Press MODE button.**
The setting is completed.
Light is on for approximately 3 to 20 seconds while data of the decided function No. and setting No. is transmitted.
(Example)
Function number: "01" (lighting for 3 to 20 seconds)
Setting number: "01" (lighting for 3 to 20 seconds)



Then, the screen goes back to the function number blinking indication (1) , if the setting is sequentially conducted, continue with the same procedures. If the setting is finished, proceed to (5) .

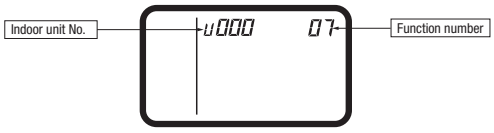
(5) **Press ON/OFF button.**
The setting is completed.

[In the case of selecting the indoor unit function (07-14)]
① **"88" blinks on the temperature setting indicators.**
(blinking for approximately 2 to 10 seconds while data is read)
↓
After that, the current setting number of the selected function number blinks.
(Example)
Function number: "07" (lighting)
Setting number: "01" (blinking)



Proceed to ② .

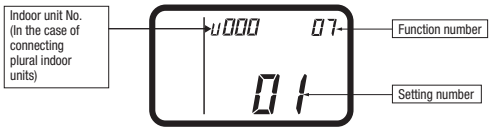
[Note]
a. In the case of connecting one remote control to plural indoor units, the display will be as follows:
Indoor unit No. display: "U 000" (blinking)
(Display the lowest number among the connected indoor units.)



b. Press TEMP△ or TEMP▽ button.
Select the indoor unit No. to be set.
If "U ALL" is selected, the same setting can be set to all units.
c. Press MODE button.
Decide the indoor unit No.
"88" blinks on the temperature setting indicators. (blinking for 2 to 10 seconds while data is read)
When AIR CON NO. button is pressed, go back to the indoor unit selection display (for example, "U 000" blinking).

② **Press TEMP△ or TEMP▽ button.**
Select the setting number

③ **Press MODE button.**
The setting is completed.
Light is on for approximately 3 to 20 seconds while data of the decided function No. and setting No. is transmitted.
(Example)
Indoor unit No.: "U 000" (lighting for 3 to 20 seconds)
Function number: "07" (lighting for 3 to 20 seconds)
Setting number: "01" (lighting for 3 to 20 seconds)



Then, the screen goes back to the function number blinking indication (1) , if the setting is sequentially conducted, continue with the same procedures. If the setting is finished, proceed to (5) .

- Even if ON/OFF button is pressed during setting, the setting is ended. However, any details where the setting has not been completed will be ineffective.
- The setting contents are stored in the controller, and even if the power failure occur, this will not be lost.

[Confirmation method for current setting]
According to the operation, the "setting number" displayed first after selecting "function number" and pressing MODE button is the currently set content.
(However, in the case of selecting "U ALL" (all units), the setting number of the lowest number among the indoor units is displayed.)

12.4 Interface kit (SC-BIKN-E)

RKZ012A088 ⓐ

Accessories included in package

Be sure to check all the accessories included in package.

No.	Part name	Quantity
①	Indoor unit's connection cable (cable length: 1.8m)	1
②	Wood screws (for mounting the interface: ø4x 25)	2
③	Tapping screws (for the cable clump and the interface mounting bracket)	3
④	Interface mounting bracket	1
⑤	Cable clamp (for the indoor unit's connection cable)	1

Safety precautions

Before use, please read these Safety Precautions thoroughly before installation.

- All the cautionary items mentioned below are important safety related items to be taken into consideration, so be sure to observe them at all times.

⚠Warning	Incorrect installation could lead to serious consequences such as death, major injury or enviromental destruction.

- Symbols used in these precautions

❗	Always go along these instruction.

- After completed installation, carry out trial operation to confirm no anomaly, and ask the user to keep this installation manual in a good place for future reference.

⚠ Warnings

❗

- **Installation must be carried out by a qualified installer.**
  If you install it by yourself, it may cause an electric shock, fire and personal injury , as a result of a system malfunction.
- **Install it in full accordance with the instruction manual.**
  Incorrect installation may cause an electric shock, fire and personal injury.
- **Electrical work must be carried out by a qualified electrician in accordance with the technical standard for electrical equipment, the indoor wiring standard and this instruction manual.**
  Incorrect installation may cause an electric shock, fire and personal injury.
- **Use the specific cables for wiring. And connect all the cables to terminals or connectors securely and clamp them with cable clamps in order for external forces not to be transmitted to the terminals directly.**
  Incomplete connection may cause malfunction, and lead to heat generation and fire.
- **Use the original accessories and specified components for installation.**
  If the parts other than those prescribed by us are used, it may cause an electric shock, fire and sersonal injury.

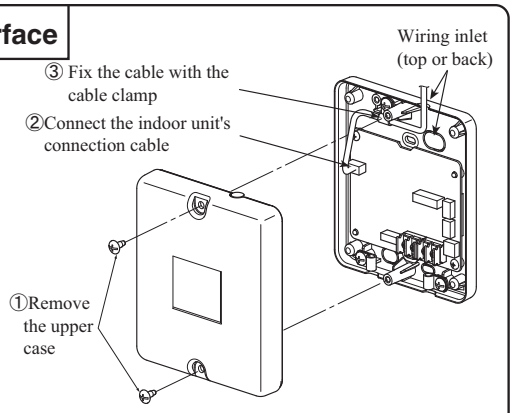
Connecting the indoor unit's connection cable to the interface

①Remove the upper case of the interface.
- Remove 2 screws from the interface casing before removal of upper casing.

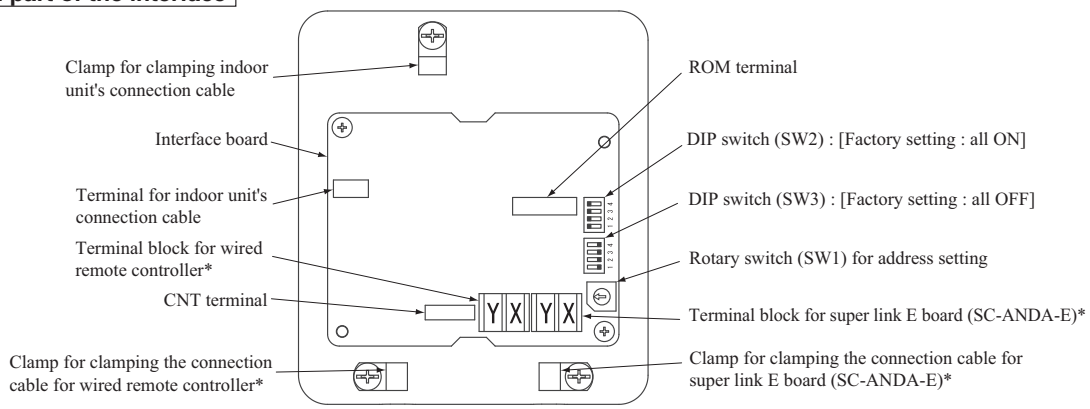
②Connect the indoor unit's connection cable to the interface.
- Connect the connector of the indoor unit connection cable to the connector on the interface's circuit board.

③Fix the indoor unit's connection cable with the cable clamp.
- Cable can be brought in from the top or from the back.
- Cut out the punch-outs for the connection cables running into the casing with cutter.

④Connect the indoor unit's connection cable to the indoor control PCB.
- Connect the indoor unit's connection cable to the indoor control PCB securely.
- Clamp the connection cable to the indoor control box securely with the cable clamp provided as an accessory.
- Regarding the cable connection to the indoor unit, refer to the instruction manual for indoor unit.


Wiring inlet
(top or back)
③ Fix the cable with the cable clamp
②Connect the indoor unit's connection cable
①Remove the upper case

Name of each part of the interface


Clamp for clamping indoor unit's connection cable
Interface board
Terminal for indoor unit's connection cable
Terminal block for wired remote controller*
CNT terminal
Clamp for clamping the connection cable for wired remote controller*
ROM terminal
DIP switch (SW2) : [Factory setting : all ON]
DIP switch (SW3) : [Factory setting : all OFF]
Rotary switch (SW1) for address setting
Terminal block for super link E board (SC-ANDA-E)*
Clamp for clamping the connection cable for super link E board (SC-ANDA-E)*
Y X Y X

*Either the connection cables of super link E board (SC-ANDA-E) or of wired remote controller is connectable.

Switch	Setting	Function	Switch	Setting	Function
SW2-1	ON**	CNT level input	SW2-3	ON**	External input (CNT input)
	OFF	CNT Pulse input		OFF	Operation permission/prohibition (CNT input)
SW2-2	ON**	Wired remote controller : Valid	SW2-4	ON**	Heat pump
	OFF	Wired remote controller : Invalid		OFF	Cooling only

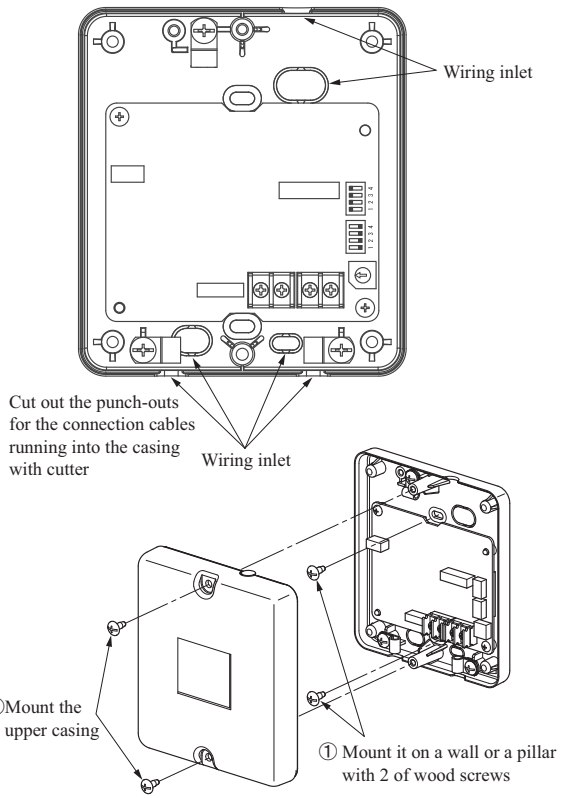
** Factory setting

Installation of the interface

- Install the interface within the range of the connection cable length (approximately 1.3m) from the indoor unit.
- Be sure not to extend the connection cable on site. If the connection cable is extended, malfunction may occur.
- Fix the interface on the wall, pillar or the like.

●DO NOT install the interface and wired remote controller at the following places.

- ○Places exposed to direct sunlight
- ○Places near heating devices
- ○High humidity places
- ○Surfaces where are enough hot or cold to generate condensation
- ○Places exposed to oil mist or steam directly
- ○Uneven surface

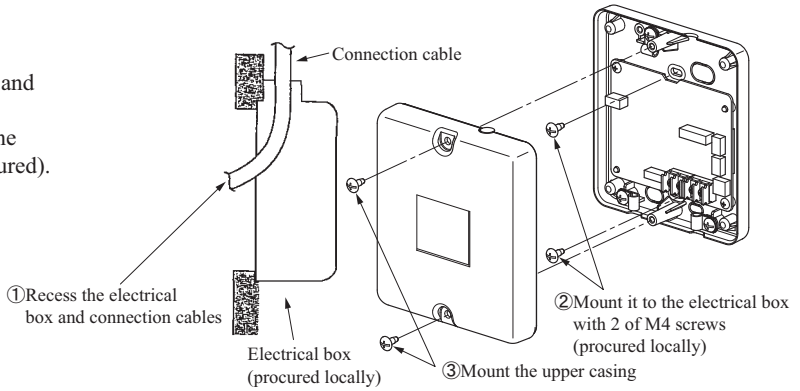

Wiring inlet
Cut out the punch-outs for the connection cables running into the casing with cutter
Wiring inlet
②Mount the upper casing
① Mount it on a wall or a pillar with 2 of wood screws

Mounting the interface directly on a wall

①Mount the lower casing of the interface on a flat surface with wood screws provided as standard accessory.
②Mount the upper casing.

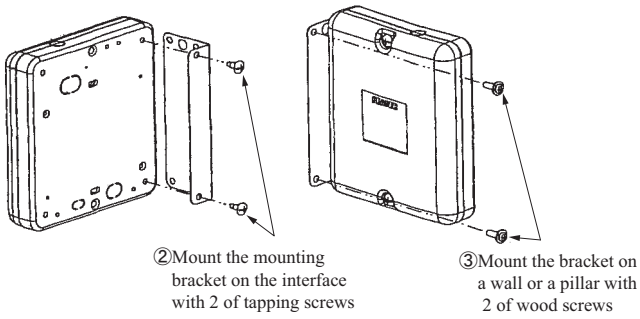
Recessing the interface in the wall

①Recess the electrical box (locally procured) and connection cables in the wall.
②Mount the lower casing of the interface to the electrical box with M4 screws (locally procured).
③Mount the upper casing.


Connection cable
①Recess the electrical box and connection cables
Electrical box (procured locally)
②Mount it to the electrical box with 2 of M4 screws (procured locally)
③Mount the upper casing

Mounting the interface with the mounting bracket

①Mount the mounting bracket to the interface with tapping screws provided as standard accessory.
②Mount the mounting bracket on wall or the like with wood screws provided as standard accessory.
③Mount the mounting bracket to a wall surface, etc. using the wood screws provided.


②Mount the mounting bracket on the interface with 2 of tapping screws
③Mount the bracket on a wall or a pillar with 2 of wood screws

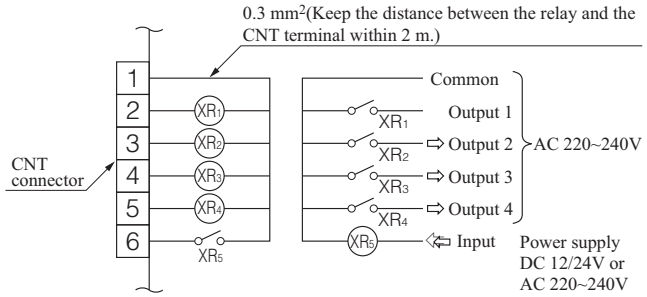
Installation check items

☐ Are the connection cables connected securely to the terminal blocks and connectors?
☐ Are the thickness and length of the connection cables conformed with the standard?

Functions of CNT connector

It is available to operate the air conditioning unit and to monitor the operation status with the external control unit (remote display) by sending the input/output signal through CNT connector on the indoor control PCB.

①Connect a external remote control unit (locally procured) to CNT terminal.
②In case of the pulse input, switch OFF the DIP switch SW2-1 on the interface PCB.
③When setting operation permission/prohibition mode, switch OFF the DIP switch SW2-3 on the interface PCB.



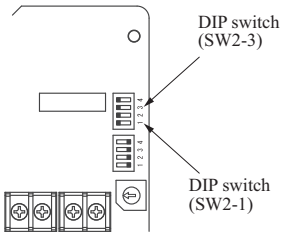
Input/ Output	Function	Output signal		Content
		Relay	ON/OFF	
Output 1	Operation output	XR_1	ON	During air-conditioner operation
Output 2	Heating output	XR_2	ON	During heating operation
Output 3	Compressor operation output	XR_3	ON	During compressor running
Output 4	Malfunction output	XR_4	ON	During anomalous stop

- $XR_{1\sim4}$ are for the DC 12V relay
- XR_5 is a DC 12/24V or AC 220~240V relay
- CNT connector (local) maker, model

Connector	Molex	5264-06
Terminals	Molex	5263T

Input/ Output	Function	SW2-1 Setting		SW2-3 Setting	SW2-3 Input signal Level/Pulse	SW2-3 Input signal XR_5	SW2-3 Content	Air-Conditioner	Operation by Remote Controller
Input	External control input	ON*	Level input	ON*	Level	OFF→ON	External input	ON	Allowed
						ON→OFF		OFF	
				OFF		OFF→ON	Operation permission	OFF	
						ON→OFF	Operation prohibition	OFF	Not allowed
		OFF	Pulse input	ON*	Pulse	OFF→ON	External input	OFF→ON	Allowed
								ON→OFF	
				OFF	Level	OFF→ON	Operation permission	ON	
						ON→OFF	Operation prohibition	OFF	Not allowed

* Factory setting

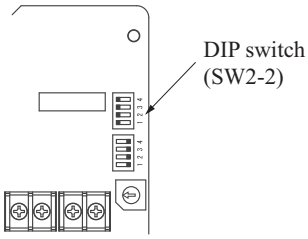


Connection of super link E board

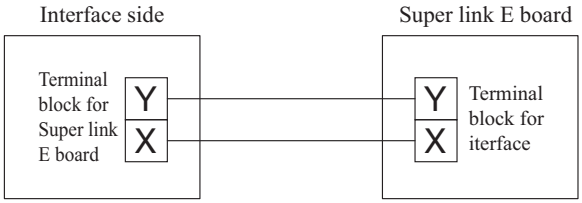
Regarding the connection of super link E board, refer to the instruction manual of super link E board.
For electrical work, power supply for all of units in the super link system must be turned OFF.

①Switch ON the DIP switch SW2-2 (Factory setting: ON) on the interface PCB.

Caution: Wireless remote controller attached to the indoor unit can be used in parallel, after connecting the wired remote controller. However, some of functions other than the basic functions such as RUN/STOP, Temperature Setting, etc. may not work properly and may have a mismatch between the display and the actual behavior.



②Wiring connection between the interface and the super link E board.

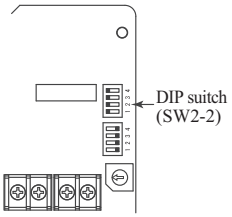


No.	Names of recommended signal wires
1	Shielded wire
2	Vinyl cabtyre round cord
3	Vinyl cabtyre round cable
4	Vinyl insulated wirevinyl sheathed cable for control

Within 200 m 0.5 mm² × 2 cores
Within 300 m 0.75 mm² × 2 cores
Within 400 m 1.25 mm² × 2 cores
Within 600 m 2.0 mm² × 2 cores

③Clamp the connection cables with cable clamps.

Connection of wired remote controller



Regarding the connection of wired remote controller, refer to the instruction manual of wired remote controller.
①Switch ON the DIP switch SW2-2 (Factory setting : ON) on the interface PCB.

Caution: Wireless remote controller attached to the indoor unit can be used in parallel, after connecting the wired remote controller. However, some of functions other than the basic functions such as RUN/STOP, Temperature Setting, etc. may not work properly and may have a mismatch between the display and the actual behavior.

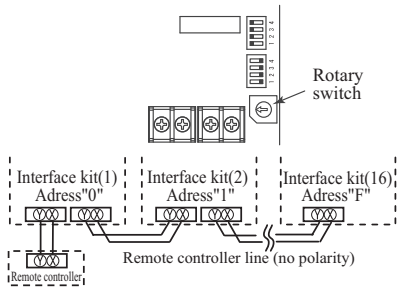
②Wiring connection between the interface and the wired remote controller.

Installation and wiring of wired remote controller

Ⓐ Install the wired remote controller with reference to the attached instruction manual of wired remote controller.
Ⓑ 0.3mm² x 2-core cable should be used for the wiring of wired remote controller.
Ⓒ Maximum length of wiring is 600m.
If the length of wiring exceeds 100m, change the size of cable as mentioned below.
100m-200m: 0.5mm² x 2-core, 300m or less: 0.75mm² x 2-core, 400m or less: 1.25mm² x 2-core, 600m or less: 2.0mm² x 2-core
However, cable size connecting to the terminal of wired remote controller should not exceed 0.5mm². Accordingly if the size of connection cable exceeds 0.5mm², be sure to downsize it to 0.5mm² at the nearest section of the wired remote controller and waterproof treatment should be done at the connecting section in order to avoid contact failure.
Ⓓ Don't use the multi-core cable to avoid malfunction.
Ⓔ Keep the wiring of wired remote controller away from grounding (Don't touch it to any metal frame of building, etc.).
Ⓕ Connect the connection cables to the terminal blocks of the wired remote controller and the interface securely (no polarity).
③Clamp the connection cables with cable clamps.

Control of multiple units by a single wired remote controller

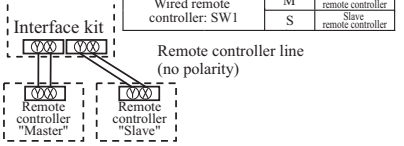
Multiple units (up to 16) can be controlled by a single wired remote controller.
In this case, all units connected with a single wired remote controller will operate under the same mode and same setting temperature.
①Connect all the interface with 2-core cables of wired remote controller line.
②Set the address of indoor unit for remote controller communication from "0" to "F" with the rotary switch SW1 on the interface PCB.
③After turning the power ON, the address of indoor unit can be displayed by pressing AIR CON button on the wired remote controller.
Make sure all indoor units connected are displayed in order by pressing ▲ or ▼ button.



Master/Slave setting wired when 2 of wired remote controller are used

Maximum two wired remote controller can be connected to one indoor unit (or one group of indoor units)
①Set the DIP switch SW1 on the wired remote controller to "Slave" for the slave remote controller. (Factory setting : Master)
○ Caution : Remote controller sensor is invalid.

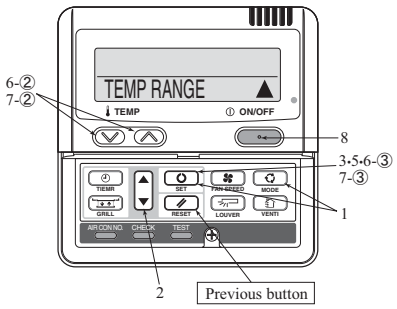
Switch	setting	contents
Wired remote controller: SW1	M	Master remote controller
	S	Slave remote controller



●When using the wireless remote controller in parallel with the wired remote controller;
Temperature setting range should be changed with the wired remote controller (The set temperature may not be displayed correctly on the wireless remote controller, unless change of temperature setting range is done.)
Changing procedure of temperature setting range is as follows.

How to set upper and lower limit of temperature sting range

1. Stop the air-conditioner, and press ○ (SET) and ⟳ (MODE) button at the same time for 3 seconds or more.
The indication changes to"FUNCTION SET▼"
2. Press ▼ button once, and change to the "TEMP RANGE▲" indication.
3. Press ○ (SET) button, and enter the temperature range setting mode.
4. Confirm that the "Upper limit ▼ " is shown on the display.
5. Press ○ (SET)button to fix.
6. ①Indication: "☝∨ ∧ SET UP"→"UPPER 28℃ ∨ ∧"
②Select the upper limit value 30℃ with temperature setting button △."UPPER30℃∨ " (blinking)
③Press ○ (SET) button to fix. "UPPER 30℃" (Displayed for two seconds)
After the fixed upper limit value displayed for two seconds, the indication will return to"UPPER LIMIT▼".
7. Press ▼ button once, "LOWER LIMIT ▲ " is selected, press ○ (SET) button to fix.
①Indication: "☝∨ ∧ SET UP" → "LOWER 20℃∨ ∧"
②Select the lower limit value 18℃ with temperature setting button ▽."LOWER18℃∧ " (blinking)
③Press ○ (SET) button to fix. "LOWER 18℃" (Displayed for two seconds)
After the fixed lower limit value displayed for two seconds, the indication will return to"LOWER LIMIT▼"
8. Press ON/OFF button to finish.



Temperature setting range

Mode	Temperature setting range	Upper limit	Lower limit
Heating	16-30℃	20-30℃	16-26℃
Other than heating (Cooling, Fan, Dry, Auto)	18-30℃		

・It is possible to quit in the middle by pressing ON/OFF button, but the change of setting is incompleted.
・During setting, if pressing ✎ (RESET) button, it returns to the previous screen.

12.5 Super link E board (SC-ADNA-E)

PJZ012D029F

- Read and understand the instructions completely before starting installation.
- Refer to the instructions for both indoor and outdoor units.

Safety precautions

- Carefully read “Safety precautions” first. Follow the instructions for installation.
- Precautions are grouped into “Warning⚠” and “Caution⚠”. The “Warning⚠” group includes items that may lead to serious injury or death if not observed. The items included in the “Caution⚠” group also may lead to serious results under certain conditions. Both groups are crucial for safety installation. Read and understand them carefully.
- After installation, conduct the test operation of the device to check for any abnormalities. Describe how to operate the device to the customer following the installation instruction manual. Instruct the customer to keep this installation instruction for future reference.

⚠Warning

- This device should be installed by the dealer where you purchase the device or a licensed professional shop. If the device is incorrectly installed by the customer, it may result in electric shock or fire.
- Install the device carefully following the installation instruction. If the device is incorrectly installed, it may result in electric shock or fire.
- Use the accessory parts and specified parts for installation. If any parts that do not match the specifications are used, it may result in electric shock or fire.
- A person with the electrical service certification should conduct the service based on the “Technical standards for electrical facilities”, “Electrical Wiring Code”, and the installation instruction. If the work is done incorrectly, it may result in electric shock or fire.
- Wiring should be securely connected using the specified types of wire. No external force on the wire should be applied to any terminals. If a secure connection is not achieved, it may result in electric shock or fire.

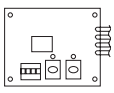
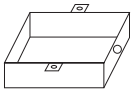
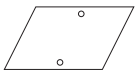
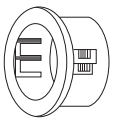
⚠Caution

- Provide ground connection.
  The ground line should never be connected to the gas supply piping, the water supply piping, the lightning conductor rod, nor the telephone ground.If the grounding is improper, it may result in electric shock.
- Do not install the device in the following locations.
  1.Where there is mist/spray of oil or steam such as kitchens.
  2.Where there is corrosive gases such as sulfurous acid gas.
  3.Where there is a device generating electromagnetic waves.
  These may interfere with the control system resulting in the device becoming uncontrollable.
  4.Where flammable volatile materials such as paint thinner and gasoline may exist or where they are handled. This may cause a fire.

1 Application

Indoor-to-outdoor three core communication specification type 3 (since October 2007)

2 Accessories

SL E board	Metal box	Metal cover	Screw for Ground
			M4×8L 2 pieces
Pan head screws	Locking supports	Binding band	Grommet
ø4×8L 2 pieces	To secure the print board and the metal box Made of nylon 4 pieces		

3 Function

Allowing the center console SL1N-E, SL2NA-E, and SL3N-AE/BE to control and monitor the commercial air conditioning unit.

4 Control switching

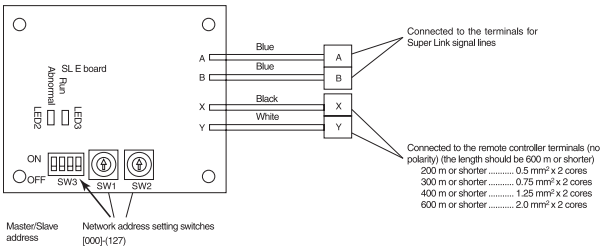
Settings can be changed by the switch SW3 on the SL E board as in the following.

Switch	Symbol	Switch	Remarks
SW3	1	ON	Master
		OFF (default)	Slave
	2	ON	Fixed previous protocol
		OFF (default)	Automatic adjustment of Super Link protocol
	3	ON	Indicates the forced operation stop when abnormality has occurred.
		OFF (default)	Indicates the status of running/stop as it is, when abnormality has occurred.
	4	ON	The hundredth address activated “1”
		OFF (default)	The hundredth address activated “0”

5 Connection Outline

Note for setting the address

- Set the address between 00 and 47 for the previous Super Link connection and between 000 and 127 for the new Super Link connection. (*1)
- Do not set the address overlapping with those of the other devices in the network. (The default is 000)



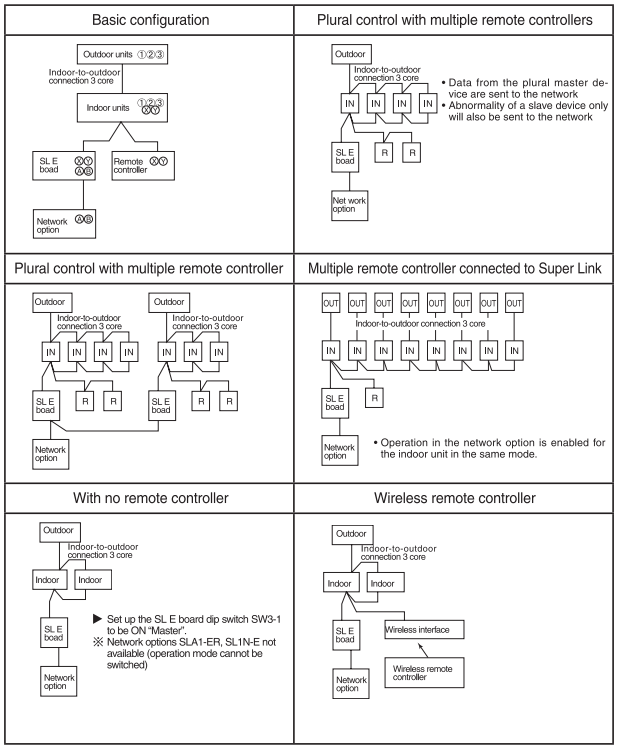
(*1) Whether the actual link is either the new Super Link or the previous Super Link depends on the models of the connected outdoor and indoor units. Consult the agent or the dealer.

Signal line specification

Communication method	Previous Super Link	New Super Link
Line type	MVVS	MVVS
Line diameter	0.75 - 1.25mm^2	0.75/1.25mm^2
Signal line (total length)	up to 1000m	up to 1500/1000m (*2)
Signal line (maximum length)	up to 1000m	up to 1000m

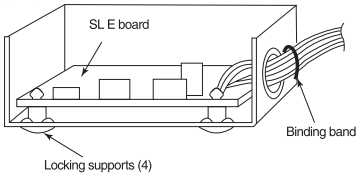
(*2) Up to 1500 m for 0.75 mm², and up to 1000 m for 1.25 mm².
Do not use 2.0 mm². It may cause an error.
(*3) Connect grounding on both ends of the shielding wire.
For the grounding method, refer to the section “6 Installation”.

(1) Set the Super Link network address with SW1 (tens place), SW2 (ones place), and SW3 (hundreds place).
(2) Set the SL E board SW3-1 to be ON (Master) when using this without any remote controller (no wired remote controller nor wireless remote controller).
(3) Set up the plural master/slave device using the dip switches on the indoor unit board.
(4) Set up the remote controller master/slave device using the slide switch on the remote controller board.
(5) Set up "0" to "F" using the address rotary switch on the indoor unit board when controlling the indoor unit with the multiple remote controller.

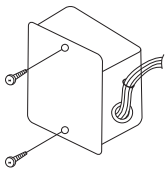

Basic configuration
Plural control with multiple remote controllers
Outdoor units ①②③
Indoor-to-outdoor connection 3 core
Indoor units ①②③
SL E boad
Remote controller
Network option
Outdoor
• Data from the plural master device are sent to the network
• Abnormality of a slave device only will also be sent to the network
Net work option
Plural control with multiple remote controller
Multiple remote controller connected to Super Link
• Operation in the network option is enabled for the indoor unit in the same mode.
With no remote controller
Wireless remote controller
▶ Set up the SL E board dip switch SW3-1 to be ON "Master".
※ Network options SLA1-ER, SL1N-E not available (operation mode cannot be switched)
Wireless interface
Wireless remote controller

6 Installation

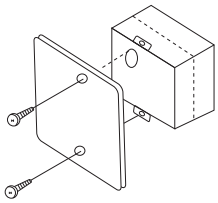
1. When using the metal box (mounted on the indoor unit / mounted on the back of the remote controller):
   (1) Mount the SL E board in the metal box using the locking supports.
   (2) Wiring should go through the provided grommet since then through the wiring to the hole on the Metal box.
   Secure the grommet after inserting the grommet into the Metal box as shown in below figure, then tie the wiring at the outlet of the unit using a binding band.



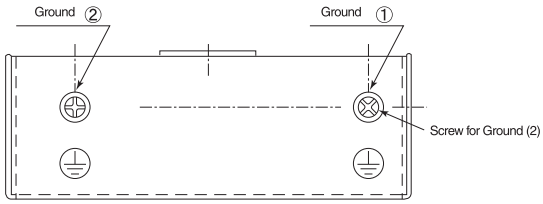
▲ When installed outside the indoor unit, put the metal cover on.



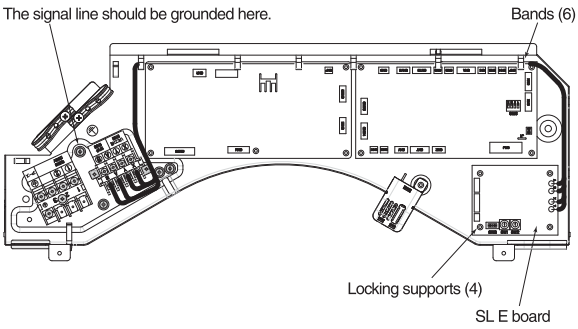
▲ When installed on the back of the remote controller, mount it directly on the remote controller bottom case.



Connect grounding. Connect grounding for the power line to Ground ①, and grounding for the signal line to Ground ② or to the Ground on the indoor unit control box.



2. When connecting to the indoor unit control box (ceiling-concealed type and FDT type only):
   (1) Mount the SL E board in the control box using the locking supports.
   (2) Remove 6 bands from the box and put the wiring through the bands to be secured.



Electrical shock hazard! Make sure to turn the power off for servicing. Be cautious so that no abnormal force should be applied to the wiring. Do not let the SL E board hung by the wiring. Do not damage the board with a screw driver.
The board is sensitive to static electricity. Release the static electricity of your body before servicing.
(you can do this by touching the control board which is grounded).

Location of installation

Install the device at the location where there are no electromagnetic waves nor where there is water and dust. The specified temperature range of the device is 0 to 40°C. Install the device at the location where the ambient temperature stays within the range. If it exceeds the specification, make sure to provide solution such as installing a cooling fan. When used outside of the range, it may cause abnormal operation.

7 Indicator display

Check the LED 3 (green) and LED 2 (red) on the SL E board for flashing.

SL E board LEDs		Inspection mode	Display on the integrated network control device
Red	Green		
Off	Flashing	Normal communication	
Off	Off	• Disconnection in the remote controller communication line (X or Y) • Short-circuit in the remote controller communication line (between X and Y) • Faulty indoor unit remote controller power • Faulty remote controller communication circuit • Faulty CPU on SL E board	No corresponding unit number
One flash	Flashing	• Disconnection in the Super Link signal line (A or B) • Short-circuit in the Super Link signal line (between A and B) • Faulty Super Link signal circuit	
Two flashes	Flashing	• Faulty address setting for the SL E board (Set up the address for previous SL E board : more than 48 new SL E board : more than 128)	
Three flashes	Flashing	• SL E board parent not set up when used without a remote controller • Faulty remote controller communication circuit	E1
Four flashes	Flashing	• Address overlapping for the SL E board and the Super Link network connected indoor unit	E2
Off	Flashing	• Number of connected devices exceeds the specification for the multiple indoor unit control	E10

INVERTER RESIDENTIAL AIR CONDITIONERS

MITSUBISHI HEAVY INDUSTRIES, LTD.

Air-Conditioning & Refrigeration Systems Headquarters
16-5, 2-chome, Kounan, Minato-ku, Tokyo, 108-8215, Japan
Fax : (03) 6716-5926

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